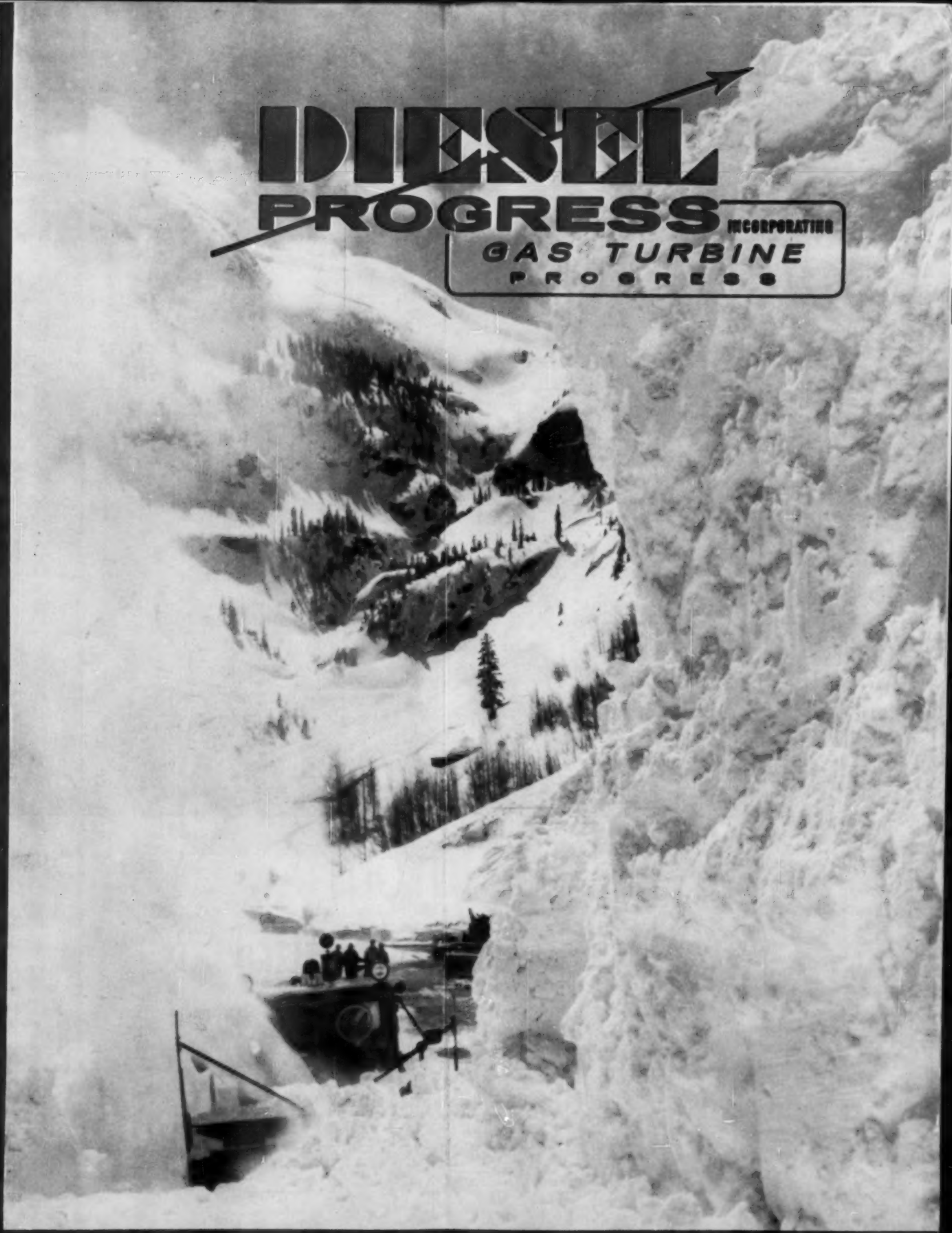


IN INDUSTRY • IN TRANSPORTATION • ON THE SEA • IN THE AIR

DIESEL PROGRESS

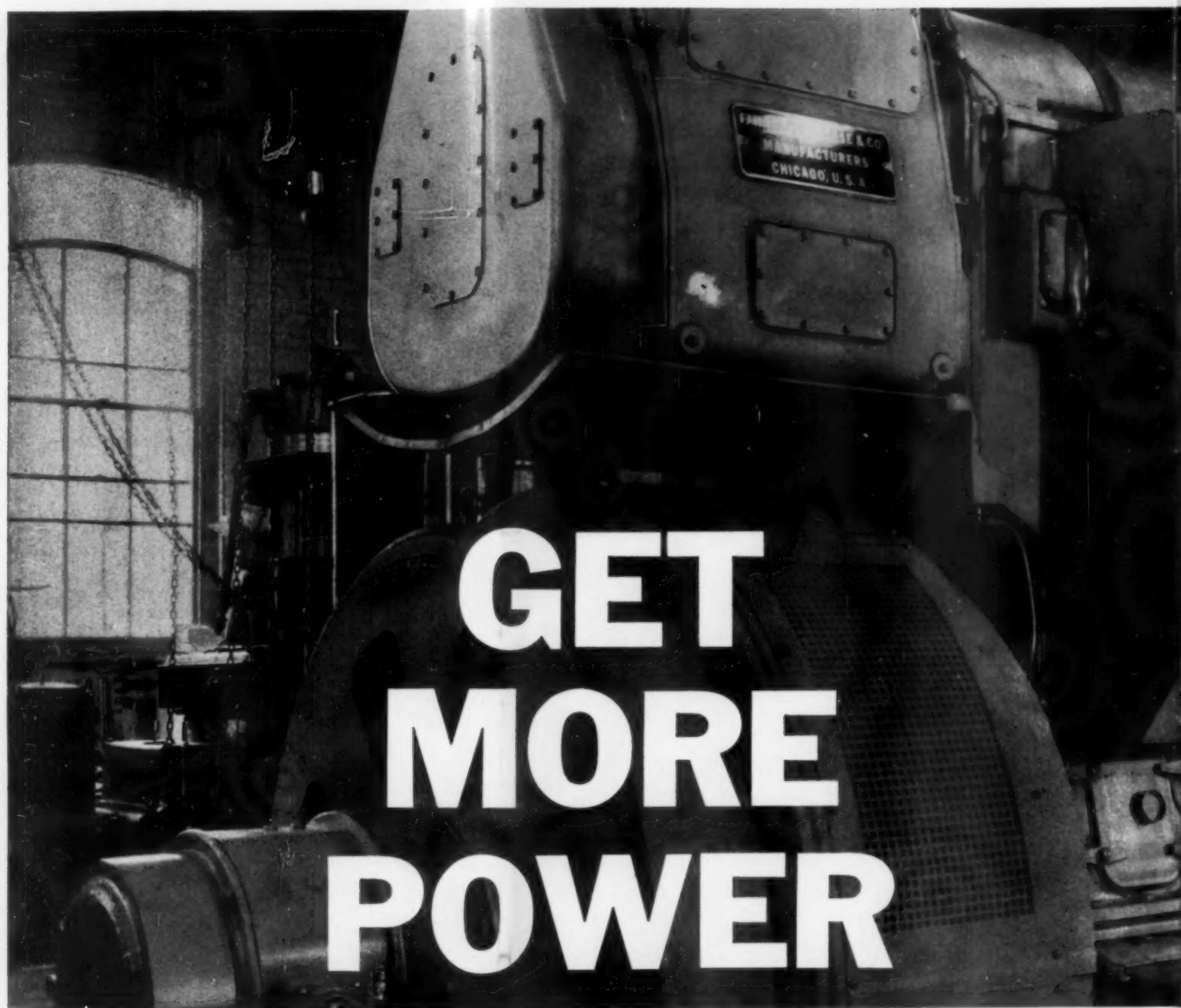
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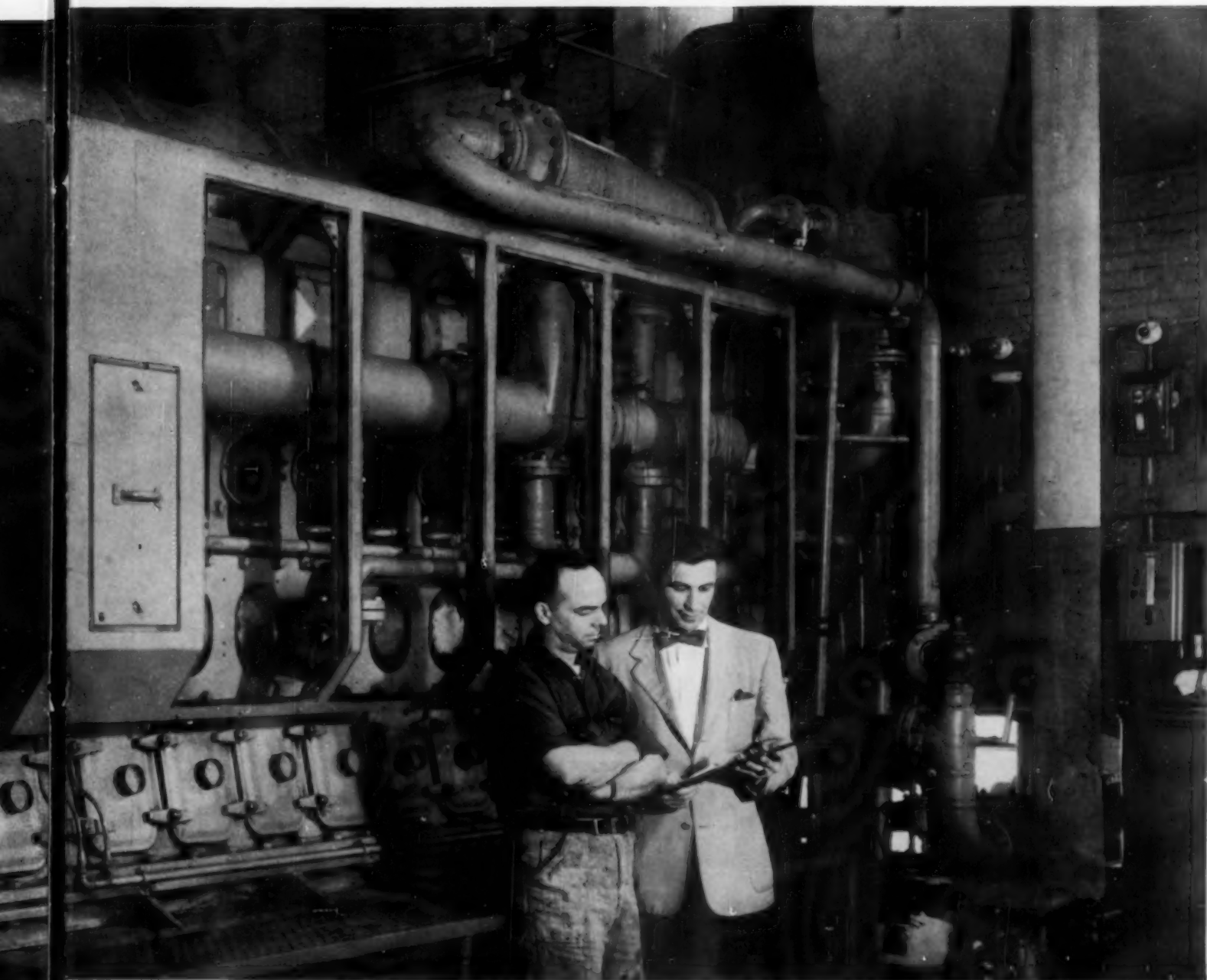
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DECEMBER, 1958

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with
Texaco Ursa Oil Heavy Duty



You get more power from diesels lubricated with Texaco Ursa Oil Heavy Duty because you can be sure the engine will stay free of sludge and harmful deposits. Valves stay clean, and rings stay free, to give you full compression and complete fuel combustion.

Complete combustion of fuel means full power—and less fuel per horsepower. Texaco Ursa Oil Heavy Duty is fully detergent and dispersive—holds all the power-robbing contaminants so the engine itself stays like new: economical, reliable, with fewer overhauls.

There is a complete line of Texaco Ursa Oils for diesel, gas and dual-fuel engines. Your local

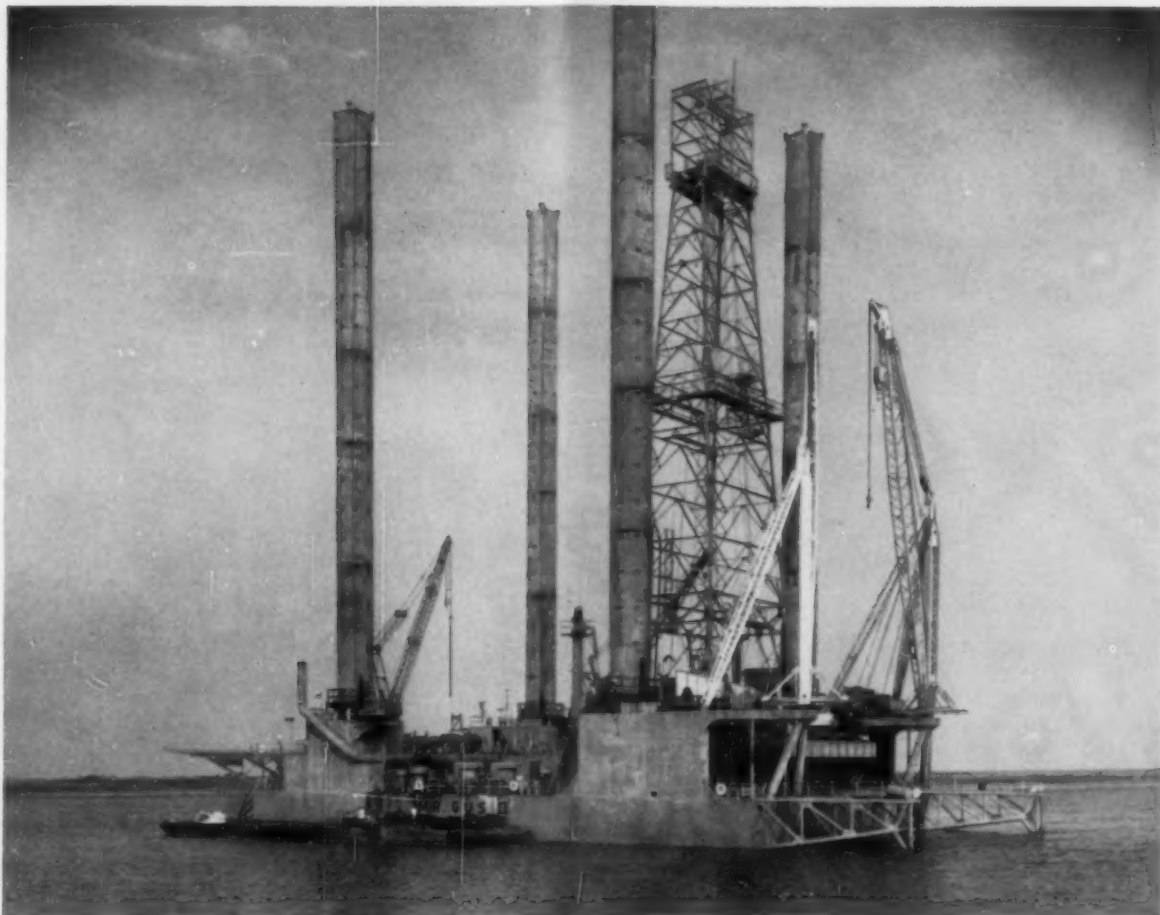
Texaco Lubrication Engineer will gladly help you choose the right ones for your application. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write The Texas Company, 135 East 42nd Street, New York 17, N. Y.



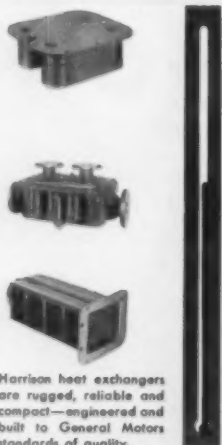
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**20 HARRISON-COOLED DETROIT DIESEL ENGINES PROVIDE 5,000 H.P.
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Harrison heat exchangers are rugged, reliable and compact—engineered and built to General Motors standards of quality.

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FRONT COVER ILLUSTRATION

Powered by Cummins and Caterpillar engines, the Snowblast rotary plow clears 34 ft. avalanche that covered a highway for 2000 ft. between Ouray and Durango, Colorado.

greater power...
more economy!



White's Superior HIGH COMPRESSION* GAS ENGINES

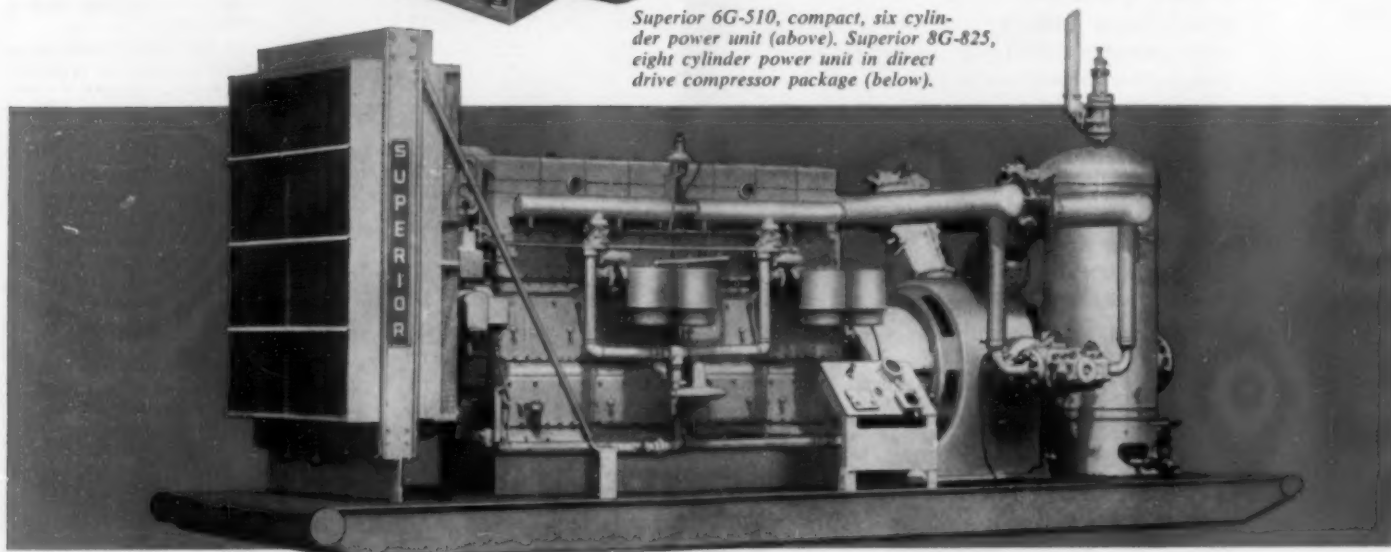
... for all oil field jobs ... compressors,
electric generators, drilling, production,
pipeline pumping, and repressuring.

White's new developments in the G-510 and G-825 gas engines include new piston crown contours, new cylinder head intake passage contours, and more efficient combustion chamber cooling. These improvements achieve greater fuel-air turbulence, higher compression, more thrust for higher torque, longer valve life, and less fuel consumption ... resulting in important fuel savings.

Outstanding design simplicity eliminates high mortality parts. Rugged, high-quality construction requires fewer replacement parts ... maintenance and repair costs are reduced to a minimum over a long engine life of dependable, continuous, heavy-duty service. Get complete information from leading oil field distributors, White oil field representatives, or through White Diesel Engine Division.

*High compression engines designed for natural gas or propane fuel. Standard ratio engines also available.

Superior 6G-510, compact, six cylinder power unit (above). Superior 8G-825, eight cylinder power unit in direct drive compressor package (below).



horsepower ratings

| model | cylinders | rpm | continuous | intermittent | maximum |
|--------|-----------|------|------------|--------------|---------|
| 6G-510 | 6 | 1000 | 330 | 370 | 412 |
| 6G-825 | 6 | 900 | 465 | 525 | 590 |
| 8G-825 | 8 | 900 | 625 | 705 | 790 |

White's conservative ratings indicate actual usable horsepower performance of standard stock engines equipped with radiator. No correction necessary to 1500 ft. elevation and 90°F.



White Diesel

WHITE DIESEL ENGINE DIVISION, THE WHITE MOTOR COMPANY, Plant and General Offices: Springfield, Ohio

4th ANNUAL

GAS TURBINE CONFERENCE

AND

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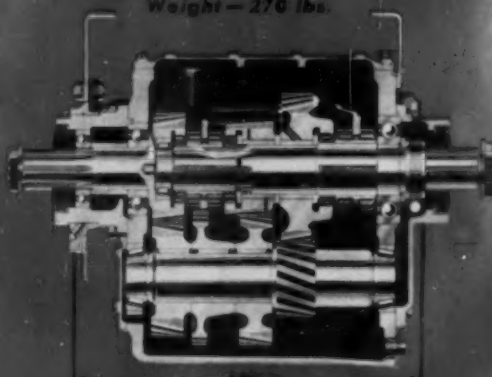
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of the
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29 West 39th Street, New York 18, New York

Model 3-A-65
Weight — 270 lbs.

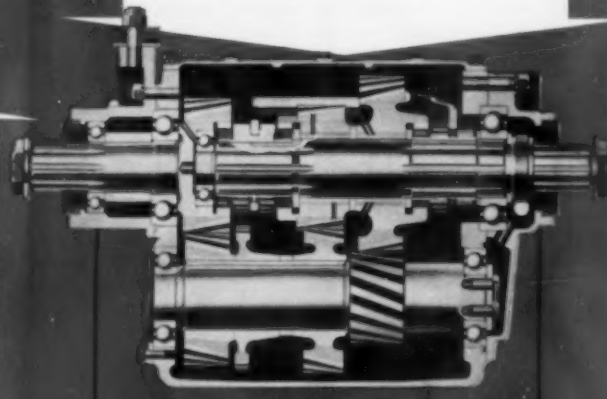


92 Series (Heavy-Duty)

| MODEL | RATIOS | | |
|--------|--------|--------|------|
| | High | Medium | Low |
| 3-A-92 | .75 | 1.00 | 2.09 |
| 3-B-92 | .84 | 1.00 | 1.24 |
| 3-C-92 | .75 | 1.00 | 2.64 |
| 3-D-92 | .75 | 1.00 | 1.24 |
| 3-E-92 | .84 | 1.00 | 2.09 |
| 3-F-92 | .84 | 1.00 | 2.64 |
| 3-G-92 | 1.00 | 1.327 | 2.09 |
| 3-H-92 | 1.00 | 1.327 | 2.64 |

65 Series (Medium-Heavy-Duty)

| MODEL | RATIOS | | |
|--------|--------|--------|-------|
| | High | Medium | Low |
| 3-A-65 | .754 | 1.00 | 2.221 |
| 3-B-65 | .804 | 1.00 | 1.239 |
| 3-C-65 | .754 | 1.00 | 1.239 |
| 3-D-65 | .804 | 1.00 | 2.221 |
| 3-E-65 | .804 | 1.00 | 1.74 |
| 3-F-65 | .754 | 1.00 | 1.74 |
| 3-G-65 | 1.00 | 1.32 | 2.221 |
| 3-H-65 | 1.00 | 1.32 | 1.74 |



Model 3-A-92 • Weight — 350 lbs.

Now

...the most complete line of 3-speed AUXILIARY Transmissions

The Fuller Manufacturing Company now offers the most complete line of three-speed auxiliary transmissions . . . for transport, logging, construction, mining and crane carrier services . . . at lower prices than competitive units in a comparative capacity range.

The extremely rugged heavy-duty 92 Series has been completed by the addition of 5 new sets of gear ratios, Models 3-D-92 through 3-H-92. Four new sets of gear ratios, Models 3-E-65 through 3-H-65 have been added to the medium heavy-duty 65 Series.

Split Gears and GO

The expanded line of three-speed

auxiliary units includes splitting ratios, both underdrive and overdrive. With these splitting ratios, the engine can operate at maximum horsepower through a full range of vehicle speeds. Ideal for over-highway operation, the extra gears allow faster schedules, greater profits.

Deep Reductions

Deep reductions, in combination with splitting ratios, offer maximum flexibility both on and off-highway where the deep reduction is required for extreme grades and soft footing, and where splitting efficiency is required for traffic conditions.

Longer Equipment Life

With engines working in the most efficient torque and horse-power range, there is less lugging . . . less wear . . . and greater fuel economy. Result: lower maintenance costs, less downtime, longer engine and transmission life.



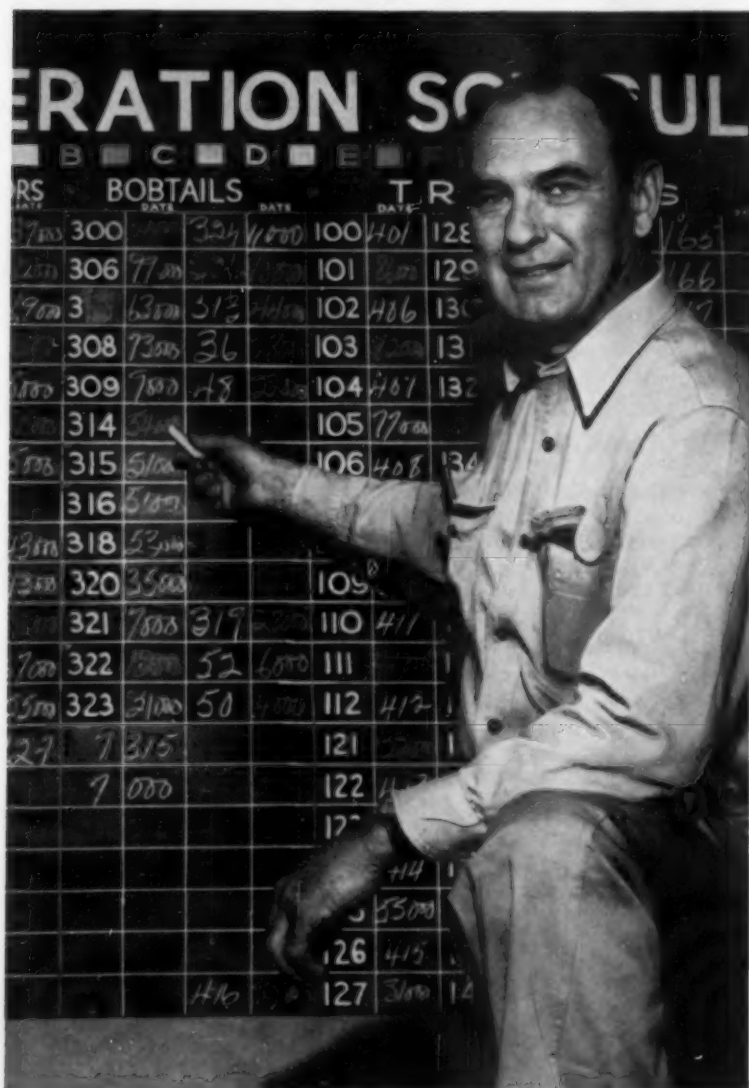
FULLER MANUFACTURING CO., Transmission Division • Kalamazoo, Mich.
Subsidiary, Eaton Manufacturing Company

Unit Drop Forge Div., Milwaukee 1, Wis. • Shuler Axle Co., Louisville, Ky. (Subsidiary) • Sales & Service, All Products, West. Dist. Branch, Oakland 6, Cal. and Southwest Dist. Office, Tulsa 3, Okla.

ENGINEER'S FIELD REPORT

PRODUCT RPM DELO Oil
STERLING TRANSIT CO.
FIRM Montebello, California

350,000 miles on RPM DELO before rebuilding



800-mile round trip between Oakland and Los Angeles is regular run for firm's big Kenworths and Internationals. Mr. Schuster makes frequent dipstick checks (above), reports make-up RPM DELO Oil for trip averages only 5 quarts. Older trucks use cleanable filters; newer units, replaceable cartridges. All use RPM DELO Oil exclusively.

Why RPM DELO Oils reduce wear—prolong engine life

- Oil stays on engine parts—hot or cold, running or idle
- Anti-oxidant resists lacquer formation
- Detergent keeps parts clean
- Special compounds prevent corrosion of bearing metals
- Inhibitor resists crankcase foaming.



For More Information or the name of your nearest distributor, write or call any of the companies listed.

Using RPM DELO Oil, Sterling Transit Co.'s 15 diesel tractors run an average of 250,000 miles before overhaul. "In fact, we get 350,000 to 400,000 miles out of them before engines are removed for rebuilding," reports Maintenance Manager Bill Schuster (above). "Regular oil changes are an important part of our preventive maintenance program. This color-coded chart indicates the mileage and condition of any unit in our 82-truck fleet...and these records show that RPM DELO Oil is doing a good job."

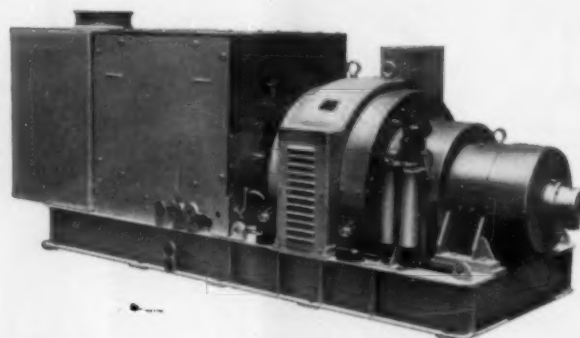


TRADEMARKS "RPM DELO" AND CHEVRON DESIGN REG. U.S. PAT. OFF.

STANDARD OIL COMPANY OF CALIFORNIA, San Francisco 20
THE CALIFORNIA OIL COMPANY, Perth Amboy, New Jersey

STANDARD OIL COMPANY OF TEXAS, El Paso
THE CALIFORNIA COMPANY, Denver 1, Colorado

Solar's 300-kw gas turbine generator offers 5 unique advantages



- ① Compactness, light weight, low-cost installation
- ② Reliable 10-second starts from -65F to 130F
- ③ No vibration, low noise levels
- ④ Low maintenance and operating costs
- ⑤ Ability to burn a wide variety of fuels



Truck-mounted Solar generators can be easily moved to remote locations.



Reliable, instant power makes these sets ideal for dozens of applications.

POWERED BY A 500 hp Jupiter® gas turbine engine... Solar's 300-kw generator set weighs only 6900 pounds and is considerably smaller than the average automobile! Installation is easy... and costs less... because lightweight, vibration-free gas turbine generators require no foundation.

Push-button starting is automatic on Jupiter-powered generators. They require no warm up, reach full power in less than 10 seconds... even after long periods of standby service. Simple in design, with few moving parts, the sets require a minimum of maintenance and no operating attendance. And they can be operated efficiently on almost any available fuel—including gasoline, kerosene, diesel fuel, jet fuels and natural or manufactured gas.

Compact, reliable Solar gas turbine generators are ideally suited for mining, missile ground support, industrial and other important applications. For detailed information, write to Dept F-99, Solar Aircraft Company, San Diego 12, California.

SOLAR
AIRCRAFT COMPANY



SAN DIEGO
DES MOINES

Cardinal Chemical's latest fracturing units use Twin Disc drives as standard

The latest additions to Cardinal Chemical Incorporated's sand fracturing equipment are four torque converter equipped pumping units, each unit having two Cummins VT-1200 Diesel Engines and two Twin-Disc Heavy-Duty 11,500 Series Three-Stage Torque Converters.

Specifications for these units are the result of long experience with Twin Disc Torque Converters. As James D. McLaughlin, Director of the firm's Engineering & Equipment Department, describes this experience: "We've had no converter trouble—no service failures—on any of our 18 Twin Disc Torque Converters, some of which have operated over four years. We have much less

downtime on torque converter rigs, too—and we do 31 or 32 jobs a month! The torque converter's fluid connection dampens out the shocks and vibrations that otherwise cause frequent parts failures."

Mr. McLaughlin goes on to point out that: "... by using Twin Disc Torque Converters, we are able to operate with less equipment and actually get more work done!" This feature is a result of the torque converter's characteristic of multiplying engine torque automatically and instantaneously as the load increases... and permitting engines to operate at their most efficient speed regardless of load conditions.

On Cardinal Chemical's new frac-

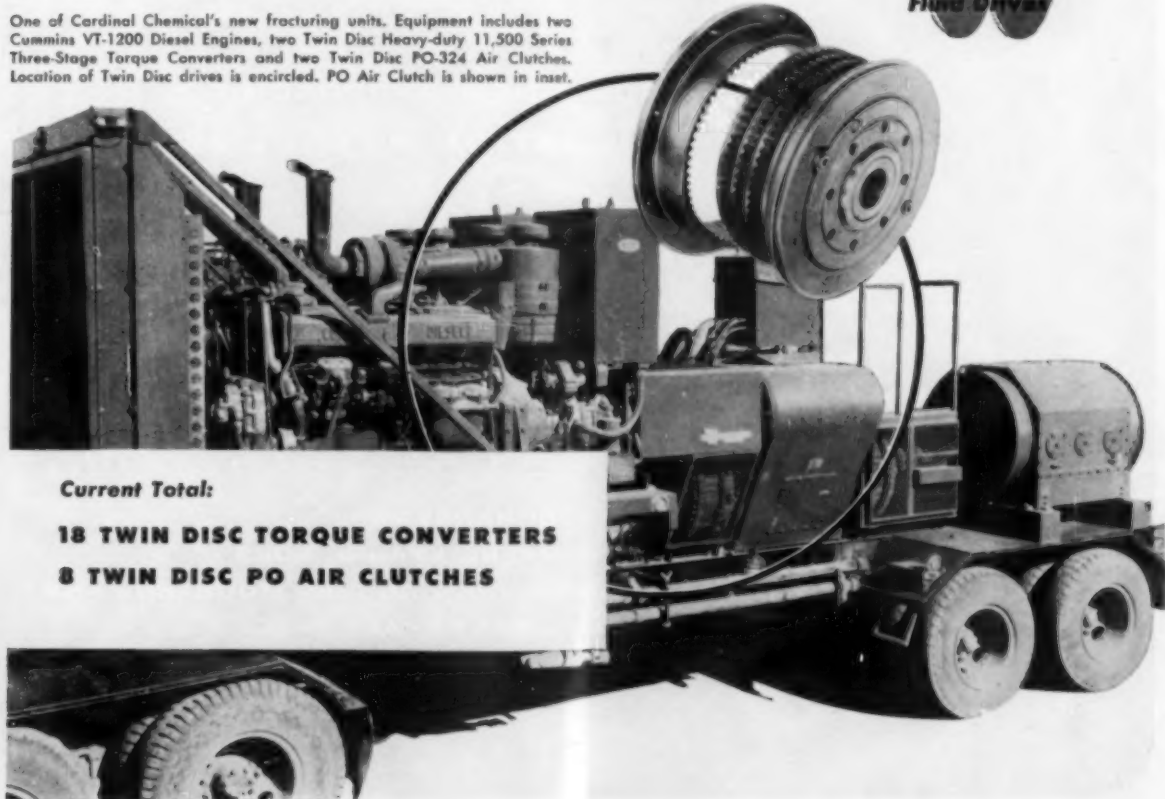
turing units, each Twin Disc Torque Converter drives through a Twin Disc Model PO-324 Air Clutch. This provides a reliable and convenient means of connecting and disconnecting the flow of power from a remote location. These air clutches are particularly adaptable to all types of oilfield applications because of their ability to stand up under high torque loads over long periods of operation.

Twin Disc offers both three-stage and single-stage torque converters... for oilfield applications to 1000 hp. PO Air Clutches are available from 8 to 36 inches in diameter... to 166,800 lb.-ft. in torque capacity.

For further information, write to Twin Disc Clutch Company, Racine, Wisconsin (air clutches); or Hydraulic Division, Rockford, Illinois (torque converters).



One of Cardinal Chemical's new fracturing units. Equipment includes two Cummins VT-1200 Diesel Engines, two Twin Disc Heavy-duty 11,500 Series Three-Stage Torque Converters and two Twin Disc PO-324 Air Clutches. Location of Twin Disc drives is encircled. PO Air Clutch is shown in inset.



Current Total:

**18 TWIN DISC TORQUE CONVERTERS
8 TWIN DISC PO AIR CLUTCHES**



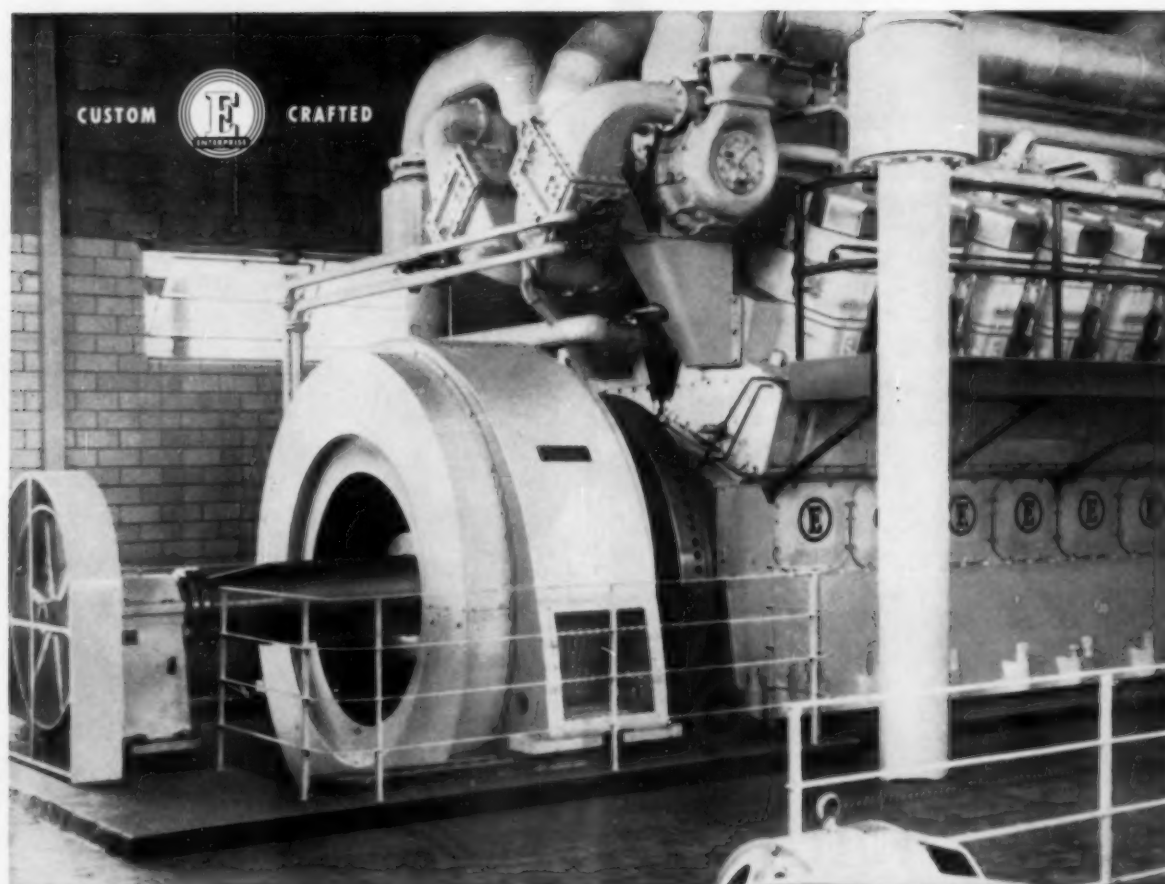
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• WATER PUMPS • AIR STARTING MOTORS •



World's Smallest Big-Horsepower Engine Now at Work for Waverly, Iowa

This Enterprise 16-cylinder Turbocharged Dual Fuel Engine is now "on the line" for the Municipal Electric Utility of Waverly, Iowa. It is the largest, most powerful engine ever built by Enterprise—yet its dimensions and weight make it the world's smallest engine in relation to its horsepower output. The Waverly engine is rated 4,890 hp—3,500 kw—at 360 rpm. Top-rated capacity of the RV: 7700 hp at 400 rpm.

Located in Waverly's West Light Plant, the Enterprise unit more than doubles the previous kw capacity of this facility, and is also generating more power than the city's East Plant with its 4 engines and 3 hydro units.

As with other custom-crafted models in the complete Enterprise line, this 110-ton engine offers many advantages which cut installation, operating and maintenance costs. Less bulk makes installation easier, servicing simpler and more economical. Maintenance requires no major disassembly because all working parts are readily accessible from the outside.

Investigate this "workhorse" source of dependable, low-cost power—the result of nearly four decades of experience, research and development. Write for Bulletin ES-B69, or ask for a representative to call.

With its new 4 cycle, 17" bore x 21" stroke RV-16 Enterprise, the Waverly installation has become known as a "showplace among the power plants of the nation."



DEPENDABLE ENGINES

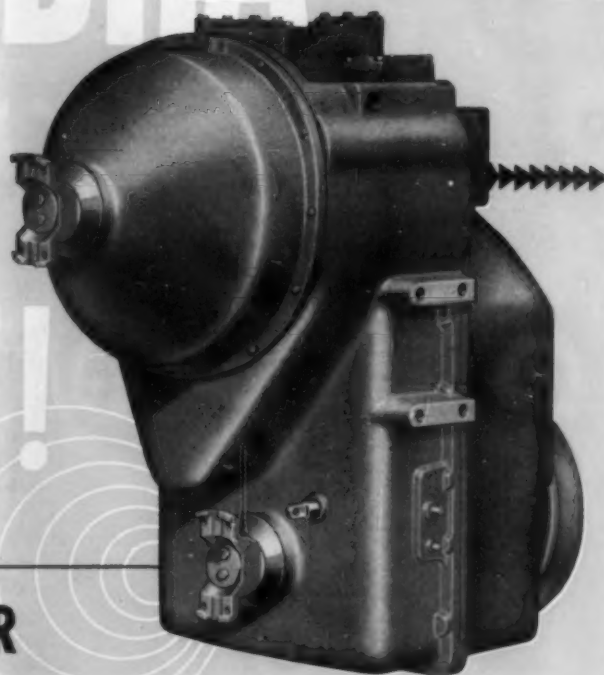
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addition
to**

HYDRA- DRIVES LINE!



← **FULL-POWER
SHIFT
TRANSMISSIONS** now available for
equipment of from 60 to 175 h.p.

Rockwell-Standard's new model Hydra-Drives Full Power Shift Transmission is now available in sizes especially designed for smaller installations, such as front end loaders, fork trucks, scrapers, crane carriers, rubber tire tractors and military vehicles. A single compact package combining torque converter and 4-speed, all power shift transmission, the Type BDB Transmission puts power to work smoothly, efficiently and economically.



**Only the Hydra-Drives BDB
offers all these major advantages:**

4 Speeds Forward and Reverse. All Power Shifted! Provides for maximum horse power to load under all load conditions.

Easier Servicing and Maintenance. Fewer moving parts and bearings. Simple, rugged countershaft design and spur gears simplify maintenance.

Full Disconnect provides for split drives and makes it easier and safer to tow.

Dual Reduced Speed Pump Drives can be driven at engine speed or $\frac{1}{2}$ engine speed for longer pump life and increased horse power to load.

Integral Design. Torque converter, transmission, oil passages, valving and oil sump are in one compact housing. Package is less bulky... up to 7 $\frac{1}{4}$ inches shorter than comparable models. Provides easier installation and less maintenance.

ENGINEERING

NEWS YOU CAN USE ABOUT ENGINE AND COMPRESSOR PERFORMANCE



← HAVING TOP RING TROUBLE?

THE SOLUTION MAY BE IN THE THIRD GROOVE — NOT THE FIRST!

If you've had trouble with your top piston rings (excessive groove wear, groove damage, ring breakage, etc.) you won't need to be convinced that the top ring carries from 50 to 80% of the sealing load. Installing top rings of special, expensive materials is often not the answer. They may be shock-resistant but generally lack adequate wearing qualities. One likely solution is installation of a Cooktite sealing ring in the THIRD groove to relieve the load carried by the first ring. In an engine with a compression pressure of 500 psi and a firing pressure of 1000 psi, a Cooktite ring in the third groove will reduce the pressure differential on the top ring from a trouble-causing 750 psi to an easily-handled 500 psi. Ask a C. Lee Cook representative to explain in detail.

PRESSURE DIFFERENTIAL AT FULL FIRING PRESSURE



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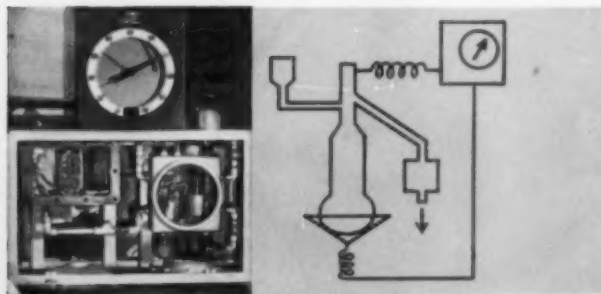
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diesel fuel delivered to you.

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Automatic end-point tester works this way. A small sample is placed in an electrically heated flask. The temperature is measured and recorded during a heating cycle when distillation is accomplished. Distillate is condensed and drained, the flask temperature is lowered by introduction of the next sample, and the apparatus is ready for another test.

You expect more from



and get it!

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1958 Diesel Engine Catalog

**New complete
information on
engines and
accessories**



look at the contents

- 1 **ENGINES**—All major manufacturers of diesel, dual fuel and gas engines are represented in multiple page sections. Text is supplemented with specifications, power curves, photographs and sectional views.
- 2 **TURBOCHARGERS and SUPERCHARGERS**—This section of manufacturers is detailed and fully illustrated to give complete information on this increasingly important phase of the industry.
- 3 **TRANSMISSIONS**—The latest information on torque converters, fluid drives, and other modern means of transmitting power are fully described and illustrated in this section.
- 4 **ACCESSORY EQUIPMENT**—Recent developments in fuel injection systems, governors, and other key accessory units are detailed and illustrated fully in this section.
- 5 **MARKET PLACE**—A convenient, time-saving listing of sources from which you can obtain the multitude of items and services needed by the fast growing Diesel Industry.
- 6 **ADVERTISING**—Leading manufacturers of engines, accessories, and services bring out the important features of their products in attractive, easy to read advertisements to further enhance the reference value of the CATALOG.

VOLUME 23 of the DIESEL ENGINE CATALOG is now available and is the biggest, most complete edition published to date. It has been completely revised and rewritten with many new or extensively changed sections graphically describing new engines and accessories. If you design, purchase, sell, operate or service diesel, dual fuel or gas engines, this new Catalog is a practical necessity. Recognized as the "Bible of the Industry," the 1958 DIESEL ENGINE CATALOG is a big 400-page book. With the same size and wide-open format as in previous editions, reference is simple and quick. Each section is fully illustrated with pictures, power curves, specification charts and sectional views. Equally important, the text presents a full description of the products and their fields of application.

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DIESEL ENGINE CATALOG

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THIS MUCH DIRT CAN RUIN A DIESEL ENGINE



THIS PUROLATOR FILTER



STOPPED THIS MUCH DIRT

Diesels can't escape abrasive dirt . . . and it takes about 8 ounces of it to ruin an engine.

The 18 pounds of dirt shown above were stopped by a Purolator heavy duty dry type air filter on a rock drilling rig in 940 hours of operation—with no servicing of the filter required. The 6 cylinder, 2 cycle engine and the 750 CFM compressor used on the job were fully

protected through the toughest operating conditions. 18 pounds of dirt were stopped . . . none got through the filter.

There's a Purolator dry type air filter designed to meet the specific requirements of your operation. Write today for full information. If you have a particularly tough problem, describe it . . . Purolator has the solution.

Filtration For Every Known Fluid

PUROLATOR
PRODUCTS, INC.

RAHWAY, NEW JERSEY AND TORONTO, ONTARIO, CANADA

ELLIOTT TURBOCHARGERS

also
serve
2-cycle
engines



Elliott has 18 years of *unmatched turbocharger background.*



This successful, simplified precision rotor—the only moving part—stands up to high operating speeds and extreme temperature variations.

No other manufacturer in the United States has so much experience in building turbochargers. Elliott covers the whole field of turbo-charged engines.



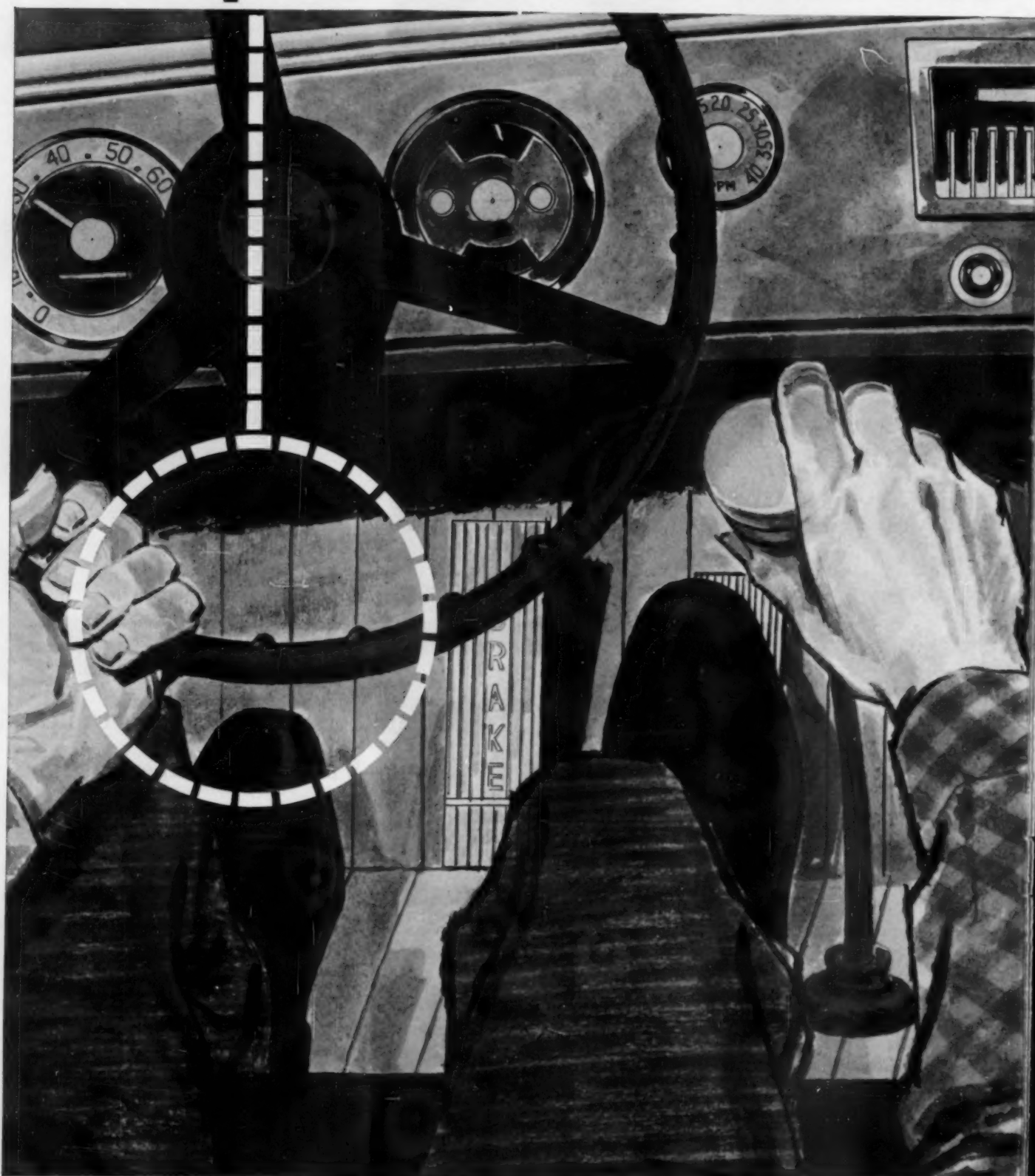
ELLIOTT Company

Turbocharger Department
Jeannette, Pennsylvania

MS-1

the clutch is in but the pedal's out...it's

Spicer's New Presto-



matic* Transmission

*...with the touch-button control
that takes the effort out of driving.*

**Here's the Semi-Automatic Truck Transmission that's
Got Everything. . . Yet its Cost is the Lowest!**

No clutch pedal . . . it's been replaced by a simple touch-button switch on top of the shift control lever. Touch the gearshift knob and the clutch is disengaged . . . automatically!

Smooth engagement from a standing start . . . without using a clutch pedal . . . because the Presto-matic Transmission automatically engages as the driver presses the accelerator.

Automatic clutch throw-out when the engine returns to idling speed. The driver can inch along in heavy traffic just as he would with a fully automatic transmission.

Lowest initial cost . . . absolutely the lowest . . . of any semi-automatic transmission system on the market.

Maximum fuel economy found only in a transmission-clutch system. And, the driver controls the gear he's in for top fuel economy in every situation.

Minimum maintenance because there are no moving parts or adjustments to be made in the automatic control mechanism. Clutch life is greatly increased since the driver can't overspeed the engine when engaging the clutch.

Maximum durability achieved through selection of simple components that have been time-tested and proved as a complete, tailored assembly.

Greater safety for the driver and his equipment because the Presto-matic Transmission leaves gear selection in the hands of the driver at all times.

Simplifies chassis design by eliminating many of the remote control linkage problems found in Cab-Over-Engine or Tilt-Cab installations.

Write now for a free illustrated booklet containing complete information on the operational advantage of the remarkable NEW PRESTO-MATIC TRANSMISSION. The address is Dana Corporation, Toledo 1, Ohio.

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Spicer

DANA CORPORATION

TOLEDO 1, OHIO

***Patent Pending**

Inland River Report

By A. D. Burroughs

A 10 kw Kohler generating plant, adequate quarters for a six-man crew, and 400 hp developed from two model D337-F Caterpillar engines are a few of the features for the new 53 x 16 ft. towboat, *J. E. Potter*. The craft was recently completed by Barbour Metal Boat Works, St. Louis, for owner Tennessee Valley Sand & Gravel Co., Ala.

BARBOUR Metal Boat Works also delivered a 50 x 18 ft. all-steel towboat to Olin Mathieson Chemical Corp. The vessel, known simply as *No. 10*, has 440 hp delivered from a GM 6-110.

PARAFFIN CUTTER, a new unusual elevating boat, is in service in Gulf waters with oil field work. Builders Elevating Boat Co., Chalmette, La., have powered the 50 x 17 ft. craft with a GM Detroit 6-71 rated at 165 hp at 1600 rpm.

IBERVILLE, a new twin screw automobile-passenger ferryboat, is operating on the Mississippi for owner, Louisiana Dept. of Highways. Built by Southern Shipbuilding Corp., Slidell, La., the side-loader has a mid-ship engineroom equipped with two model D375 Caterpillar engines.

HILLMAN Shipyard, Brownsville, Pa., has completed a new towboat for stock. The unnamed vessel is reportedly a near-duplicate of the popular *Henry L. Hillman*, a 118 x 27 ft. towboat built in 1952, powered with Superior engines for the rated 1066 hp.

PFAFF and Smith Builders Supply, Inc., Charleston, W. Va., has ordered a 42 x 14 ft. utility boat to be constructed by Humboldt Boat Service, St. Louis, with power from a GM 6-110.

CUMMINS Sales & Service, Inc., Ft. Worth, reports the sale of a Cummins engine, model HRS-6-M, to Cruso Canning Co., Biloxi Miss., for installation on a fishing craft.

A KOHLER generator model 15M25, a GM Detroit Model 6071a engine rated at 223 hp at 2100 rpm, and Allison Torqueomatic reduction gears equip the new towboat, *Harry B.* Built by Paul's Pre-Fab, Tiogo, N. D., the 36 x 10 ft. craft is in action for North Dakota owner, Mendenhall Marine Service.

E. G. SPRINKLE, Bayou Batre, Ala. has purchased a Cummins diesel engine, model NH-6-M for use on an active shrimp boat. The sale was handled by Cummins Engines, Inc., Birmingham, Ala.

MIKE CREDITOR, the towboat with four years of active performance for Ohio River Company was busy in the coal trade with 2120 hp supplied by twin Baldwin-Lima-Hamilton supercharged engines.

ON the upper Ohio, the *Gulf Inlander* was sighted. With the illuminated orange discs, this 150 x 35 ft. towboat is always

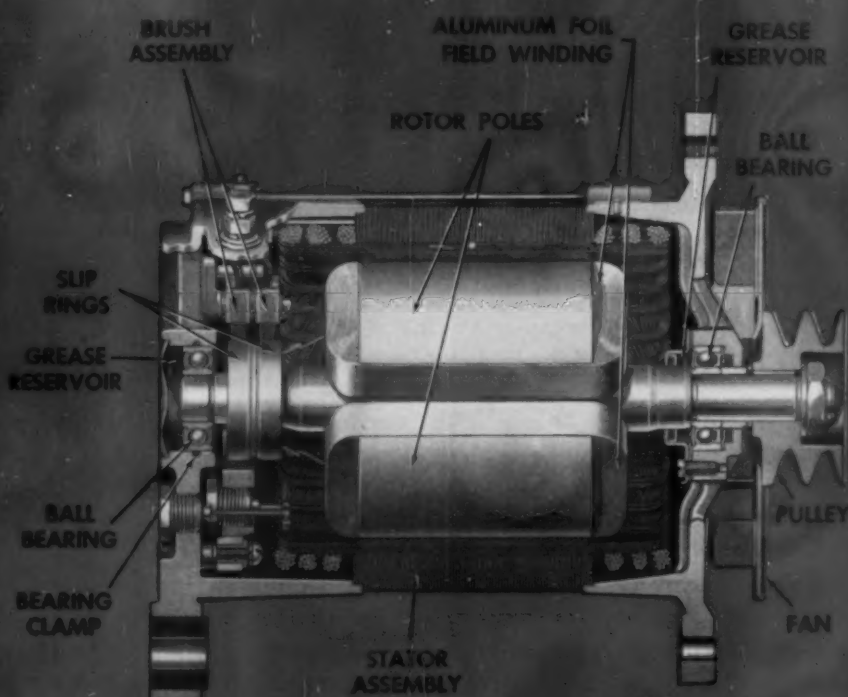
a striking show, with performance to match with 2800 hp received from two GM turbocharged engines.

VALLEY VOYAGER, a towboat with a near 6000 hp from two Nordberg Supairthermal engines, was reported at many points, from the Ohio waters to New Orleans. The fourth of a series,

the 200 ft. vessel, built by Dravo, performs for MVBL with regularity.

ROBERT Hughes has been appointed director of Research and Development of Dravo Corp., replacing W. L. Newhall who has retired after 33 years' service with the company. Dr. John A. Anthes has been named assistant director of Research and Development.

NOW! REAL CHARGE-AT-IDLE,



PROGRESSIVE
ENGINEERING
MAKES
THE
DIFFERENCE



CLAUDE TULLY, a 1950 towboat production from St. Louis Shipbuilding & Steel Co. for Patton-Tully Transportation Co., Memphis, Tenn., has joined the Cargo Carriers fleet. Two Fairbanks-Morse 10 cyl model 38 supply the 3200 hp.

INVINCIBLE Cartasca was in service on the Illinois waterways with six GM die-

sels driving three Murray and Tregurtha Harbormasters for a total 900 hp. Built in 1944, this craft was sunk, raised, and still in active service.

ANOTHER proven performer seen often in the Upper Mississippi waters is the *William Clark*. The ten-year-old towboat measures 98.1 x 28.1 ft., with 1700 hp supplied by Enterprise engines.

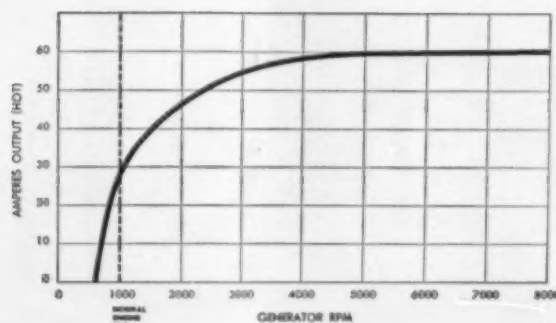
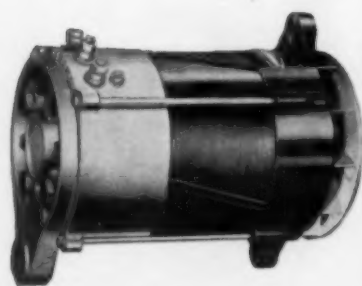
Alco Review Published

Articles on portable atomic power, a new automatic tape-control method for precision machine drilling and on electric control for oil and gas-well drilling feature the Summer-Fall issue of the *Alco Review*. The lead article in the 28 page, two-color publication describes Alco's use of electrical control for its

drilling rig power packages. The article on tape-controlled radial drilling outlines the company's use of deep-hole target-drilling machines, operated by pilot probomat systems, to drill tube-sheets for heat transfer equipment. In a third feature, How We Package Nuclear Power, an Alco atomic engineer describes the company's design for a 2000 kw portable, skid-mounted nuclear power plant. The design is based on the reactor system in the Alco-built Army Package Power Reactor, and draws on research and development work completed in connection with that reactor. Another article describes an integrated Standard Oil Co. refinery at Toledo, Ohio, and the use by Sohio of 10 Alco heat exchangers in various process applications. Copies of the Review are available from Alco Products, Inc., P.O. Box 1065, Schenectady, N.Y. **ITS NEW**

UP TO TWICE THE TOTAL OUTPUT

WHEN YOU REPLACE STANDARD D.C. EQUIPMENT WITH DELCO-REMY'S NEW SELF-RECTIFYING A.C. GENERATOR



Here's a completely new generator from Delco-Remy *specifically designed* to take care of cars and trucks with extra-heavy electrical loads under all traffic conditions . . . to increase battery life by eliminating deep cycling.

Designed to mount interchangeably with most standard d.c. generators, this compact new unit is only 5 3/4" in diameter and weighs just 31 pounds. The a.c. design eliminates commutation problems, providing extra-long brush life . . . and the ball bearings are "lifetime" lubricated so that no attention is required between engine overhaul periods. Six specially developed silicon rectifiers built into the end frame eliminate the need for space-consuming external rectifier units, reducing installation time and cost to a minimum.

Be sure to specify this new self-rectifying a.c. generator along with its companion transistor regulator (either full or transistorized model) on your new special-duty equipment for 1959. This all-new power team is still another example of Delco-Remy progressive engineering at work for you.



GENERAL MOTORS LEADS THE WAY—STARTING WITH **Delco-Remy** ELECTRICAL SYSTEMS

DELCO-REMY

DIVISION OF GENERAL MOTORS

ANDERSON, INDIANA

Ogden Appointed General Sales Manager

Appointment of Mark Ogden as general sales manager of Cummins Service and Sales, Los Angeles, the Southern California distributor of Cummins diesel engines, was announced by S. B. Cook, vice president. Mr. Ogden has been sales promotion manager for Cummins Service & Sales since January 1956. Previously he was executive editor of *Diesel Progress*; manager of advertising and public relations for Watson & Meehan, San Francisco; and vice president of Spencer Curtis, Inc., an industrial advertising agency of Indianapolis. He served in the U. S. Navy during World War II and now holds the rank of commander in the naval reserve. He was educated at Manchester College and the University of Wisconsin.

Research Facilities Completed

Allis-Chalmers Manufacturing Co. has completed construction of new engineering, development and research facilities in Greendale, Wis., a Milwaukee suburb, about two miles south of the company's West Allis Works. An initial group of approximately 100 scientists, engineers, draftsmen, technicians and administrative personnel moved into the new laboratories late in September. When in full operation, the Greendale laboratories will employ upward to 200 persons. The new facilities include two buildings providing approximately 23,000 sq. ft. of space where research, scientific studies and analyses will be carried on. One of the new buildings contains offices, a large and small conference room, file room, first-aid room, and a large area for engineering and scientific personnel. In the second building are three laboratories, machine tool and testing areas. The buildings are constructed of masonry, glass and steel panels.

Mid-West Diesel News

By L. H. Houck

TEN English Electric, V-16 diesels, generating 1103 kw each, to Merritt, Chapman & Scott, general contractors, Glen Canyon Dam, Page, Ariz., for addition to power plant which will be increased from present 5100 kw to 16,000 kw.

AN Allis-Chalmers HD11B from Chiles at Springfield, Mo., to Lebanon Const. Co., Lebanon, Mo.

PAUL Bowman, St. Louis, has repowered a White 3000 with a Cummins JT-6-B from Cummins Mo. Diesel Sales Corp., St. Louis.

WAUKESHA and Kohler will provide standby diesel generating sets for radio transmitter and receiver buildings to be constructed at Richards-Gebaur Air Force Base, Grandview, Mo. Waukesha diesel is 1197 cu. in. displacement, turbocharged, with 150 kw generator. Kohler is a 25 kw unit powered by a 226 cu. in. diesel. Both units were sold by AAA Engine & Electric, Inc., Kansas City, Kan., distributors.

YELLOW Transit Freight Lines, Kansas City, has ordered 55 additional Kenworth cab-beside-engine tractors. Engines are JT-6 Cummins and transmissions are Fuller 5-A-65 heavy-duty 5-speed units. Yellow's Transit's first move in modernizing its fleet a few years ago was to place an order for 200 Kenworths with Cummins and Fuller transmissions which reduced their cost per mile over gasoline by almost a half.

EUCLID-Illinois, Inc., distributor of Euclid Division products of GM, and Bucyrus-Erie, has opened a new modern plant on a 10 acre site at By-Pass 66 and Terminal Ave., Springfield, Ill. This is a new distributing firm of which Jack Sheldon is president.

HOLEKAMP Equipment Co., St. Louis, is distributor for Cerlist Diesel in Eastern Missouri and Southern Illinois.

NEW machinery firm in Springfield, Mo., is Contractors Supply Co., dealers for Scoopmobile, featuring Waukesha diesel, Gardner-Denver with GM and Bucyrus-Erie with Caterpillar diesels. Scoopmobile 1½ yd., LD-5P is powered with Waukesha 190-DLC-6 cylinder, 265 cu. in. diesel.

CHICAGO-Pneumatic 365 air compressor, powered with 4-71 GM diesel to Fruin-Colnon Contracting Co., from Geo. F. Smith Co., dealers, St. Louis.

OLIVER OC-12 with Hercules diesel to Lingle Excavating Co., St. Louis, from

Koste Machinery Co., St. Louis Oliver dealers.

INTERNATIONAL TD-9 with Drott 4-in-1 to R. G. Burke, Murphysboro, Ill., from Mo.-Ill. Tractor Co., St. Louis.

WEHMEYER Mining Co., Rosebud, Mo., has taken delivery on a No. 12 Hough Payloader, powered with Inter-

national UD-9 diesel, with torque converter and Hough power shift transmission, from Mo.-Ill. Tractor Co., St. Louis.

RIVERVIEW Stone & Material Co., Florissant, Mo., have placed a new HO D model Hough in service. It is powered with a Cummins diesel and has an Allison torque converter. Sale by Mo.-Ill. Tractor Co., St. Louis.

GREELY Truck Lines, Greeley, Colo., has repowered an IHC R-200 with a Cummins 175 hp JT-6-B from Cummins Diesel Sales Corp., Denver.

S. J. GROVES & Sons, Burlington, Wis., and Minneapolis, Minn., has repowered a Euclid with a Cummins NHRS-6-BI from Cummins Diesel Wisconsin, Inc., Milwaukee.

NEW CUMMINS

smooth power for all these applications:

Compressors
Cranes
Crawler Tractors
Delivery Trucks
and Tractors

Farm Tractors
Front End Loaders
Generators
Graders

Hoists
Irrigation
Lift Trucks
Marine

Pumps
Rollers
Small Shovels

CUMMINS

gives you the big plus

MORE PROFIT

After 6 years of testing and actual use under all possible conditions, the Cummins J-80 is ready for you. It's ideally suited for applications in a wide range of rugged, heavy-duty equipment. The Cummins long-life design engineered into the J-80 features a greater bearing area than any comparable diesel. Cummins research in counterbalancing provides 6 cylinder smoothness of operation in this small dimensioned, economical 4 cylinder package. The foolproof Cummins PT Fuel System is so well matched to the J-80 that fuel consumption remains at an almost constant minimum under all load conditions.

You can expect many extra hours of low cost operation for the new Cummins J-80.

For rugged applications requiring less than 80 h.p., ask about the new companion J-70 engine, rated at 70 h.p. at 2000 rpm.

NOOTER Boiler Works, St. Louis, purchased two 150 kw Murphy diesel generator sets from Cummins, McGowan & West, St. Louis.

BARBAGELLO Bros. Excavating Co., St. Louis, placed an International TD-24 with Twin Disc torque converter and dozer in excavating service. Sale by Mo.-Ill. Tractor Co.

INTERNATIONAL 350D Utility tractor with International diesel, to W. A. Blue Const. Co., at Brentwood, Mo., with Davis back-hoe and end-loader. Sale by Mo.-Ill. Tractor Co., St. Louis.

TO Harvey Granvold, Byron, Minn., a Cummins NH-180 for repowering a Diamond T 7236, from Cummins Diesel Sales, Inc., St. Paul.

White Gas Engine Bulletin

Compressor service applications in the petroleum industry for Superior high compression gas engines (200-700 hp) are detailed in two new bulletins issued by the White Diesel Engine division of the White Motor Co. Bulletin 119 contains features, specifications, dimensions, rating curves, and optional

power take-off data on the Superior 6G-510 engine, including illustrations of the block, helical gear drive system, new components, and the 6G-510 in action. Bulletin 120 provides the same information and similar photographs on the Superior six and eight cylinder G-825 series. Performance characteristics, including marked fuel economy through high compression engine design, are stressed in both folders. Copies of Bulletins 119 and 120 are available at no charge from the Customer Service Dept., White Diesel Engine Div., Springfield, Ohio.

ITS NEW

Second Contract For Jeta

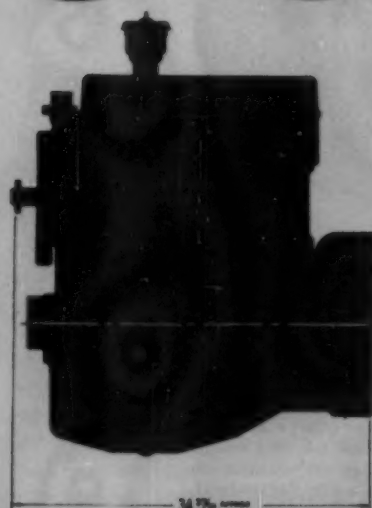
Shortly after receiving a contract award for 100 kw generator sets from the United States Corps of Engineers, the Power Equipment Division of Jeta Metal Fabricators, Inc., received a second contract from the same government procurement authority for 60 kw units. Both contracts total about a million and one-quarter dollars. Like the 100 kw units, the 60 kw diesel engine-generator plants are to be liquid-cooled, will maintain high performance at temperatures ranging from -65°F. to +125°F., and will operate at ground altitudes up to 5,000 ft. The 60 kw diesel generating plants use the Allis-Chalmers D-516 six cylinder diesel engine which incorporates the Roosa-master fuel injection system. This engine will operate at 1800 rpm and will produce 100 horsepower. Generator is manufactured by Electric Machinery Co. The 100 kw generating plants, built in the same manner for the same environmental conditions, use an Allis-Chalmers 6DA844 diesel engine with American Bosch fuel injection system. The unit is operating at 1800 rpm and the engine produces 163 horsepower. Generator is again supplied by Electric Machinery.

New Branch Manager for White

Mr. Harold R. Ginther has been named Seattle branch manager for the White Diesel Engine division of the White Motor Co. Mr. Ginther assumed his duties Sept. 1, following the recent retirement of former manager Fred Hudson. Mr. Ginther, 32, with 10 years experience in engine and power transmission sales, has until recently been Seattle area manufacturer's representative for a Portland, Ore., firm representing national lines of industrial and marine equipment. White Diesel's Seattle office is a sales and service center for the company's complete line of diesel engines and its modern facilities are located dockside at Fisherman's Terminal, center of Seattle's fishing fleet. Mr. Ginther received his B.S. degree in mechanical engineering from Purdue university in 1948. He has been an active member of the Society of Automotive Engineers.

J-80

80 horsepower
in a rugged,
compact diesel



SPECIFICATIONS:

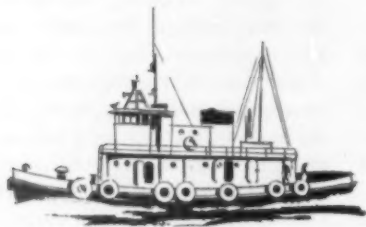
| | |
|--------------------------------------------|-----------------------------|
| Type..... | 4 Cycle Naturally Aspirated |
| Bore and Stroke..... | 4 1/2" x 5" |
| Number of Cylinders..... | 4 |
| Displacement..... | 267 cu. in. |
| Horsepower..... | 80 at 2500 rpm |
| Torque..... | 196 ft. lbs. at 1300 rpm |
| Compression Ratio..... | 16.3 to 1 |
| Weight (with standard accessories)..... | 1150 lbs. |
| Lbs. per bhp..... | 14.4 |



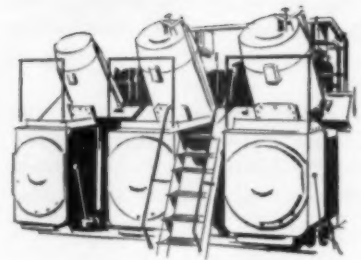
CUMMINS ENGINE COMPANY, INC., COLUMBUS, INDIANA

EXPORT—CUMMINS DIESEL EXPORT CORPORATION—COLUMBUS, INDIANA, U. S. A.—CABLE: CUMDIEX

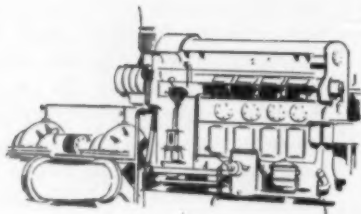
OVERSEAS FACTORY—CUMMINS ENGINE COMPANY LIMITED—SHOTTS, LANARKSHIRE, SCOTLAND
CABLE: CUMSCOT SHOTTS TELEX



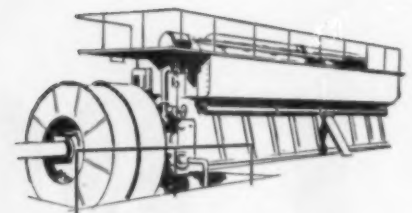
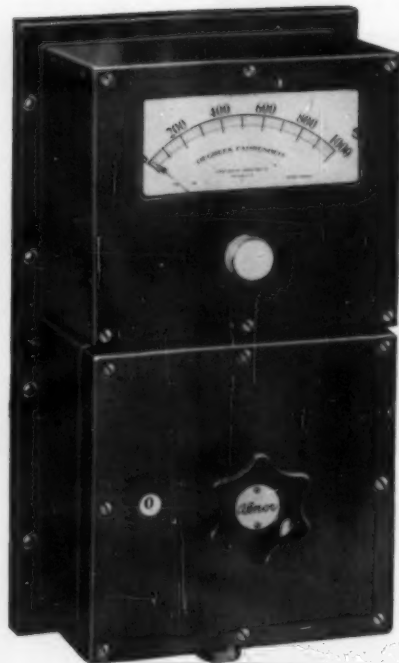
Marine



Engine compressor



Pumping



Stationary



GET THE BEST
FROM THE POWER
YOU BOUGHT...

WITH *Alnor*® PROTECTION

Accurate check of exhaust temperatures with an Alnor Pyrometer system can assure minimum fuel consumption per horsepower and long service from the power you bought—without the interruption of many common-cause breakdowns.

At a fraction of the cost of your present engine maintenance bill, an Alnor system can give you advanced warning of:

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| CYLINDER OVERLOAD | SCALED JACKETS | DETONATION |
| PREIGNITION | CLOGGED PORTS | FAULTY INJECTION |

Series A Pyrometers are designed specifically for direct mounting on diesel engines or other equipment subject to vibration and rough usage. Readings are accurate to within \pm or -1% . Dustproof, fumeproof, splashproof. Switch capacities of 4, 6, 8, 10, 12 and 16 circuits. Other models to 31 circuits. Get full information—by return mail. Send for Bulletin 4361 with complete details of the Pyrometer and thermocouple assembly designed for your engine.



writes:

ILLINOIS TESTING LABORATORIES, INC.

Room 508, 420 No. LaSalle St., Chicago 10, Illinois

FLORIDA'S BIG "R"

By ED DENNIS



A line up of Mack dieselized tractors and trailers at the Jacksonville terminal of the Greater Southern Trucking Div. of the Ryder System.

THE big "R" is the trademark of Ryder System, Inc. a young and husky trucking empire which is flexing its mighty muscles in the southern part of the United States. Jim Ryder, the rebel of the trucking industry, is a modern day Horatio Alger. He is called a rebel of the trucking industry because he favors the closest possible coordination of the different modes of transportation such as truck, rail, plane and ship to best serve the shipping industry. In a statement recently, he remarked, that now more than ever, when the country needs a strong transportation system, the industry should bury the hatchet and work together to provide the American shipper with the kind of service to which he is entitled. Ryder blazed a trail in the truck rental field, pioneered rail-trailer "piggy back" service in the south between Jacksonville and Miami, coordinated with various airlines in the interchanging of freight and conducted experimental land-sea operations.

In a corner of the southernmost state, the Ryder System, was conceived and grew from a \$125.00, second hand truck, into a gargantuan system of over 11,000 vehicles. 872 of these are dieselized "over the hiway" tractors and eventually all their hiway tractors will be dieselized units. In 1932, one of the depression years, Jim Ryder graduated from Miami Edison High School and started working as a 25¢/hr. laborer on a beach construction job.

Seeing the construction jobs dependence on trucks for supplies he purchased a used truck and began hauling for a local building supply firm on a contract basis. Working his regular 8 hr. shift mixing cement he would then pick up his truck and haul cement blocks from Ojus to Miami Beach for another 7 or 8 hrs. Three years later, Jim Ryder, had 30 trucks working for the local hauling trade. There were times when things were a bit tight especially when he had to mortgage everything he owned including the office adding machine and typewriter to borrow \$5000. Thus, in a few short years of action, Ryder, has stepped up into the makings of one of the nation's largest trucking empires. With a fleet of well over 10,000 vehicles, operating from more than 175 terminals, it is easy to see how every minute of the day and every day of the year, somewhere, scattered across 26 states and Canada, there is a big "R" truck or tractor on the highways.

Following is a breakdown of the 872 dieselized units: Great Southern, 181 Macks, 78 General Motors and 30 White units; Loo-Mac Freight Lines, 15 Macks and 20 General Motors units; T. S. C. Motor Lines, 96 Macks; Cooper Motor Lines, 50 Macks and 20 White units; Ryder Tank Line, 72 Macks; Ryder Truck Rental, 60 Macks, 20 General Motors, 50 Whites, 105 International-Harvester, 65 Diamond T's and 10 Kenworths. Makes

and models of the dieselized units in use are as follows:

| | | |
|---------------|----------------|--------|
| Mack | END 673 | 170 hp |
| G. M. C. | 6-71 | 190 hp |
| White | Cummins NH180 | 180 hp |
| White | Cummins JT 175 | 175 hp |
| International | Cummins NH 180 | 180 hp |
| International | Cummins JT 175 | 175 hp |
| Diamond T | Cummins JT 175 | 175 hp |
| Kenworth | Cummins NH 200 | 200 hp |

All the Mack tractors have Mack T. R. D. transmissions, the General Motors, Whites, Internationals, Diamond T's and Kenworth have Fuller 10 speed RoadRanger transmissions. The dieselized units operate mostly on the open highway for long hauls and gasoline powered trucks are being used on the short city trips.

In line with its continued expansion program, Ryder is going ahead with its plan to acquire several other freight hauling lines, a modernization program for its rolling stock costing about 5 million dollars, and another 2½ million dollars for new terminal facilities. Ryder pioneered the use of dragline conveyor operations to reduce freight damage, high cube van trailers, two way radios and nation wide interchange with other freight lines. Another item developed by their equipment engineers is the trailer designed with removable plastic sides that can be used either

as an open top carrier or a flat bed depending on the type of freight to be hauled. Other designs that came off their engineering boards were a special highway tanker used for hauling liquid ink and an oversized trailer to haul potato chips.

Ray E. Carter heads the newly created Research & Development Department. This department will be responsible for testing new products and engineering techniques. It is also working closely with the truck and trailer industry using Ryder companies as proving grounds to keep abreast of and encourage new developments in the engineering, maintenance and utilization of equipment. An "electronic brain" commonly known as Univac file computer, that performs 30,000 additions and subtractions a minute, has been installed in the Great Southern offices in Jacksonville marking the first use of a middle sized electronic system by a motor carrier. Great Southern handles nearly 50,000 freight shipments a week, has 8,000 miles of routes in seven states and must keep track of how far its tractors travel in each state plus 32,212,000 intercity miles which have to be sorted out to the satisfaction of all the tax collectors involved. Equally important for efficiency are the thousands of men and women of the Ryder System headed by James A. Ryder, President and Chairman of the Board of Directors. Ryder preaches and instinctively practices "positive thinking." As he said, "we have soft spots, we're not perfect, but anything anyone else can do we can do better."

Maintenance shops at Albany, Ga., Jacksonville Fla. and Miami, Fla. are well equipped with every modern facility not only for routine maintenance work but also for general overhaul and rebuilding of engines and transmissions etc. Because of their strict maintenance schedule the diesels are turning in a remarkable performance record. They have found the greatest economy is achieved by finding and fixing an ailment immediately and replacing the worn parts with new ones. In this way it helps to reduce the overall labor costs in the long run.

Talking about diesel engine performance, R. V. Hodges, shop supervisor of the Great Southern at Jacksonville, stated, after checking his records, "we are getting 6.1 miles per gal. with diesel compared to 4.2 on gasoline equipment. And with gasoline costing 20.96¢ per gal. compared to 19.83¢ per gal. for fuel oil considering the millions of miles we pile up each year it is to our benefit to look more and more to diesel engines for savings in our fleet operation."

Before going into the general maintenance program set up at the various shops, I want to mention several of the dieselized tractors looked at in the Jacksonville shops that deserve mention. One was a General Motors tractor powered with a model 6-71 General Motors 190 hp diesel and a Fuller 10 speed RoadRanger transmission that had traveled 225,000 miles without a major overhaul. Another was a Mack dieselized unit with 240,000 miles to its credit without a major overhaul. The same goes for the White tractor with a Cummins J. T. 175 diesel, it too had a high mileage on the speedometer. At Miami we ran into the case of a Fuller RoadRanger T 76 transmission which had accumulated 586,000 astonish-

ing miles and only the idler gear was replaced.

Often preached but only sometimes practiced, regular service and preventive maintenance may mean the difference in either a short or a long life for a piece of machinery. Understanding this fact quite well, the Ryder System shops, maintain a regular and up to date surgeon-like preventive maintenance program for each tractor, trailer and truck. As explained by R. V. Hodges, shop supervisor at Jacksonville, the program of preventive maintenance at the various shops is some what flexible but generally follows the pattern set up at Jacksonville which uses a 48 item check list for the diesel "A" service at every 5000 miles. This includes oil change and new filters, injectors checked and pulled if necessary and a visual inspection of all external parts such as brakes, horn, battery, clutch, air lines, all gauges and pressures, axles, air compressors, fuel oil filters, etc. The 50,000 mile diesel "B" service includes the same 48 items plus an additional 10 or 11

Two International DC205A tractors powered with Cummins J. T. 175 diesel engines and Fuller 10 speed T76 RoadRanger transmissions, getting their 48 item 5000 P. M. service at the Albany, Georgia shop of the Ryder System. Proper shop instrumentation increases operating efficiency, cuts costs and finds trouble in a hurry.

Aerial view of the offices, terminal and shops of the Great Southern Trucking Div. of the Ryder System at Jacksonville.



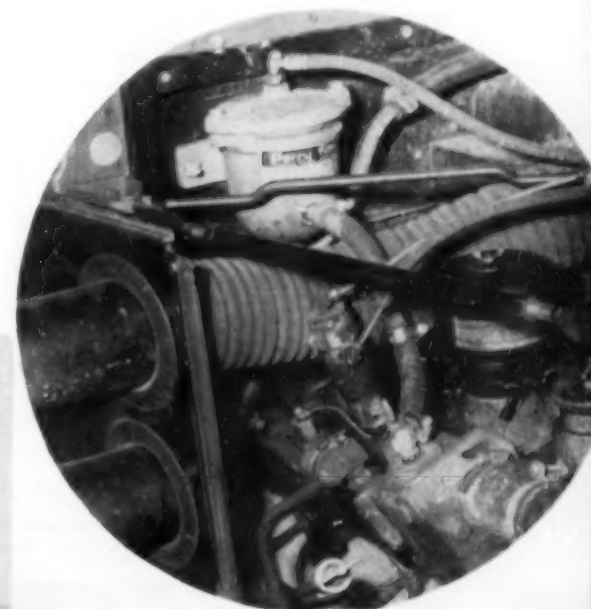


producing a faster and more accurate work schedule because of the modern production work areas and up to date testing instruments. And since the individual is still the master of the accurate work done in his shop, classes are conducted for personnel training throughout the system ranging all the way from diesel engine maintenance to tariff structures and claims handling. At the Great Southern service shops at Jacksonville, all the dieselized tractors have Perry model E water filters. Fram, Wix and Purolator fuel oil filters are used and Luber-finer secondary oil filters are being utilized in the lubricating systems.

On June 12th 1957 the "piggy back" era in Florida transportation was inaugurated when eight Great Southern Trucking Co. trailers started on a regular scheduled run between Jacksonville and Miami on flat cars of the Florida East Coast Railway. This was the first of its kind in the South.

All tractor units operating out of Jacksonville of the Great Southern Trucking Co. have Perry model E water filters.

At the Albany shop of Ryder System, two Diamond T and an International tractor have just had their 5000 mile check and are ready for the road. They are powered with Cummins diesel engines and Fuller RoadRanger transmissions.



A General Motors tractor with a G. M. 6-71 diesel engine heading for the wash rack after having its 5000 mile check up. The 78 G. M. C. tractors have Fuller RoadRanger R. D. 96, ten-speed transmissions.



items. Gasoline powered trucks are required to have a regular 3000 mile preventive maintenance service check which includes 100 items. All preventive maintenance service charts are signed by both the service mechanic and the shop superintendent before the tractor or truck leaves the shop, in that way there can not be any "buck passing." This brief outline of the routine procedure reveals several good reasons why the switch to dieselized equipment in the Ryder System is gaining momentum each day. Another very good reason is less maintenance and a second one is its dependability on long steady runs on the open highway.

Of great importance is the kind of attention given to each phase of service and maintenance of the equipment by the various Ryder shop foremen. As one of them stated, "you need the proper modern tools in the shop if you expect the mechanics to give their best to the company." Over the years improvements have been consistent in



TUGBOAT FOR NORTHWEST

Newest Addition to the Portland (Oreg.) Tugboat Fleet is This \$200,000 Enterprise Diesel Engine Powered *Western Star* Operated by the Western Transportation Co. for Log Raft Towing and Barge Work on the Columbia and Willamette Rivers.

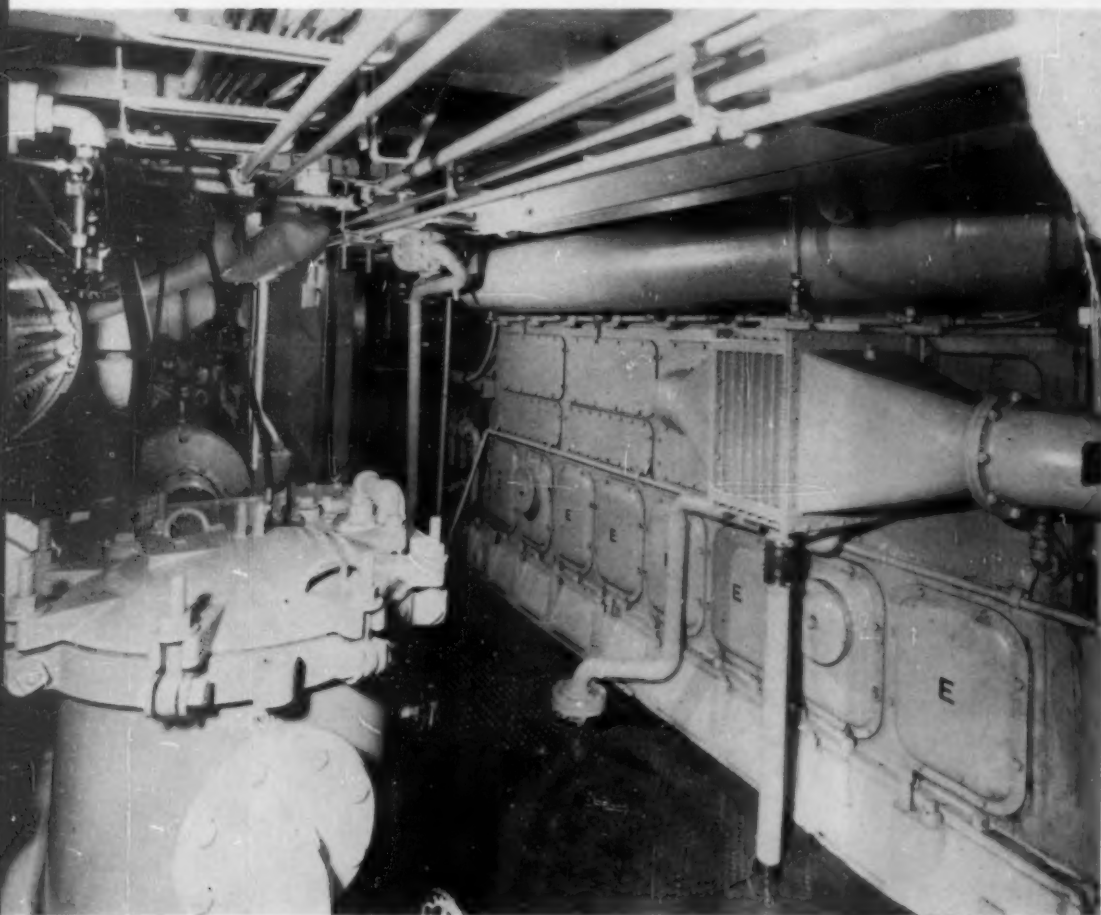
By W. L. BODE

LATEST addition to the tugboat fleet operating out of Portland's colorful waterfront is the new \$200,000 *Western Star*, a trim 840 hp vessel that according to its owners, Western Transportation Co. is the "pride and joy of the outfit." Designed for Western by Phil Brinck and constructed in record time by Portland's Gunderson Bros. Engineering Corp., the all-steel, welded hull tugboat is skippered by veteran Columbia and Willamette River Captain Sherman Pinnell. Efficient and dependable, the *Western Star* has been in service almost a year on the Columbia River delivering logs to Camas, Wash. from below Longview, Wash., working seven days a week and prac-

tically 24 hrs. each day. The tows consist of two log rafts each and the tug makes three trips per week. Each roundtrip is approximately 200 miles, with the tow load upstream. Total logs hauled per week is 2,000,000 bd. ft. of timber. The tug, designed by Brinck while associated with William Garden, Seattle naval architect and marine engineer, is powered by an 840 bhp at 350 rpm DMG-38 Enterprise diesel engine. The *Western Star* is 78 ft. long, 26.1 ft. wide, has a draft of 7.9 ft. and is 177.23 gross tons and 120 net tons.

The diesel is a direct-drive, right-hand engine, with the crankshaft rotating in a counter-clockwise

Compact and efficient engine room with 840 hp Enterprise diesel engine. Note L to R: Hilco lube oil filter, Amot thermostatic control, Young intercooler.



direction. The intercooled and turbocharged Enterprise diesel provides the *Western Star* with a cruising speed of 10.5 knots per hour. In addition to the main power plant, two 60 kw GMC engines power the boat services. "Our new *Western Star*" explains Leonard M. Thompson, President of Western Transportation, "reflects the latest step in our modernization plan designed to enable us to better serve the shippers of this area. The new tug," Thompson continued, "is the 12th in our fleet. Two others, powerful 3,200 hp converted LSM's, *George Birnie* and *Peter W.*, have been added since the end of World War II."

Western Transportation is one of the oldest shipping companies in the Pacific Northwest, having been created as the result of mergers of the Washougal and Lacamas Transportation Co., formed in 1893; the Western Transportation and Towing Co., established 1902; and the Willamette Navigation Co., formed in 1912. The owners of the new *Western Star* are authorized to operate as a common carrier from the mouth of the Columbia River to Bonneville Dam and from the mouth of the Willamette River to a point a short distance above the government locks at Oregon City, Oreg.



Mrs. Lillian Baggenstos, wife of a company foreman, George Baggenstos, won a \$100 U.S. Savings Bond for suggesting the name, *Western Star* in a contest conducted among Western Transportation's employees and their families.

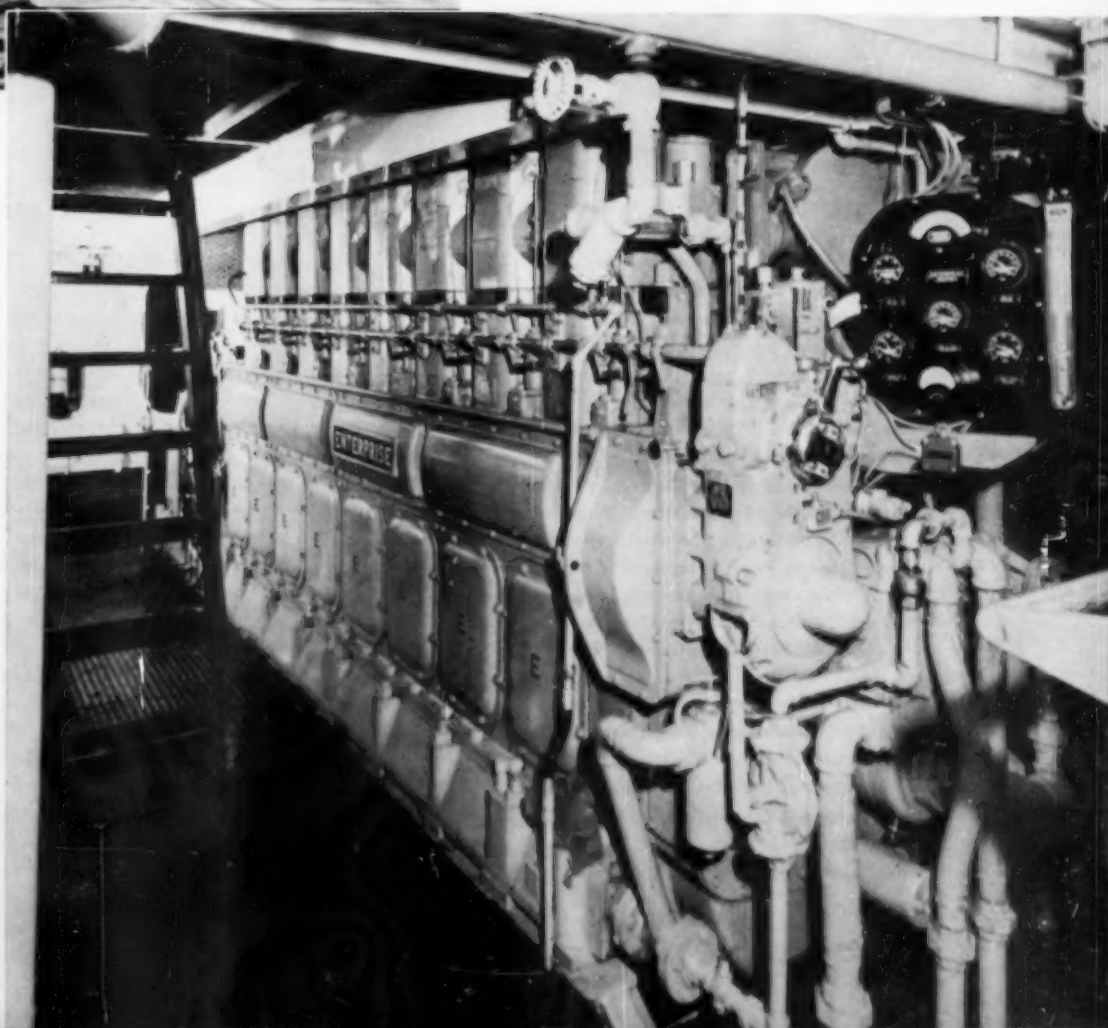
The new tug carries on the front of the house a large red 4 ft high, 5-pointed star with a diamond W, the Western Transportation Co. insignia. In addition, the tug's melodious air whistle will retain a familiar note in the cacaphony of Portland's busy waterfront. The whistle, President Thompson explains, was removed from the company's now retired diesel tug, *Western*, which was a familiar sight on the Columbia River for many years. The *Western Star* was designed for comfort as well as for efficiency and economy.

Carrying a maximum complement of 6 men, the accommodations include individual rooms for each crew member, three heads and two showers, an ultra-modern galley with deep freeze and a large refrigerator. All of the rooms are insulated and are equipped with individual electric heaters. In addition, fully screened, aluminum frame windows

were installed throughout the vessel. The tug was constructed so that every compartment of the ship, with the exception of the pilot house, can be reached from within, via inside passageways, as an added protection to crew members in adverse weather. The high pilot house also was designed to provide an exceptionally wide field of vision and all of the equipment was selected for maximum efficiency and economy of operation. This equipment includes an Adel pilot house engine control system; Sperry Gyroscope Co. electric-hydraulic steering; a Raytheon fathometer and Raytheon radar installation; ship-to-shore radio; an electric towing winch and air deck winches. The new tug has a 76 in. diameter wheel, with a 40-inch pitch, turned by a 9.25 in. diameter wheel shaft.

Engine room equipment includes a Young inter-cooler; Woodward governor; Quincy air compressor; Bendix fuel injection equipment; Kingsbury thrust bearing; Cuno lube oil pressure strainer; Purolator fuel oil strainer; Winslow fuel oil filter; Elliott turbocharger; Merriam manometer; Alnor pyrometer; Thermxchanger lube oil cooler; Air Maze intake filter-silencer; Weston tachometer; Amot thermostatic lube oil valve; Amot thermostatic jacket water valve; Maximum muffler exhaust; Hilco lube oil filter.

Enterprise diesel, which operates at 350 rpm, produces a cruising speed of 10.5 knots per hour for the 78 ft long new *Western Star*. Note: Woodward governor, Alnor pyrometer, Cuno lube oil strainer.



GRAFTON, NORTH DAKOTA

By DWIGHT P. ROBISON

TWO new Fairbanks-Morse opposed-piston engines in a new, modern plant are giving Grafton, North Dakota, the highest efficiency in its long and successful history of municipal power production. Together with two older F-M diesels, the O-P's are meeting the growing demand and cost to the consumer is going down steadily as production rises. The four diesel engines in the Grafton plant mean more to the residents than reasonable electric rates. They also are the source of substantial tax savings and numerous civic improvements. In the 31 years since the city started its municipal power operations with a small steam-operated plant, contributions to Grafton and its residents have totaled more than three-quarters of a million dollars. Based on the present population of just over 5,000, this amounts to almost \$5.00 a year for every man, woman and child. At the present per capita tax level of \$49.83, the plant's contributions are the equivalent of a 10 percent tax reduction. These contributions fall into three broad categories. Year in and year out, ever since the plant came under municipal operation in the 1890's, current for municipal lighting has been donated. In just the last fiscal year this donated current totaled 213,658 kwhs. It went not alone for street and traffic lights but for the lighting of the fire department, the police department, the City Hall, Girl Scout headquarters, the municipal skating rink, the public library and the city parking lots. The power plant has also assumed operating losses for the water department, sewage system and garbage disposal—a benefit that over the years has saved Grafton residents just over \$214,000. The remaining \$317,973 of the \$750,000 contributed to the town from plant profits has gone to the general city fund to help supplement tax receipts, for the building of a new \$92,000 armory, to pay Grafton's \$60,000 share of the cost of Homme Dam, to help defray the cost of building the water treatment plant, for drainage of the municipal airport and town park and for repurchase of Legion quarters. There would be nothing remarkable in such contributions if light rates were kept high, but Grafton has followed the practice of reducing rates as increased kilowatt-hour production and improved efficiency have brought down the cost of generation. Thus, today, the average light rate is 2.98 cents per kwh. Over the years, the town has brought down its rates 10.02 cents per kwh—from 13 cents when the town took over operations 31 years ago to 8.25 cents per kwh in 1929 to the present 2.98 cents average in 1956.

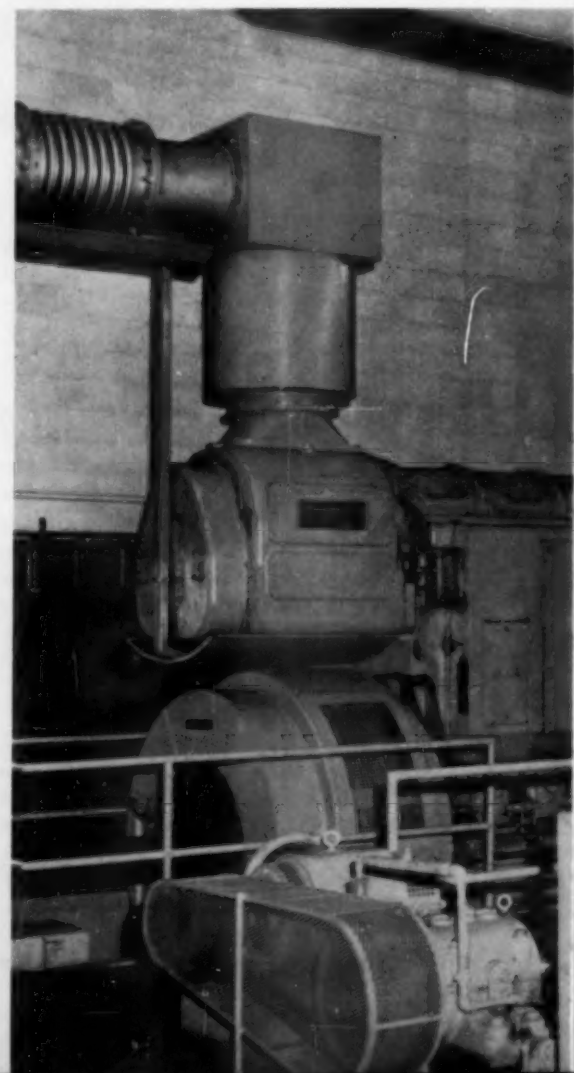
The four Fairbanks-Morse diesels that today make possible these electric rates and the many extra benefits to the city are two 1920 hp model 38D8 $\frac{1}{4}$ O-P engines with 1360 kw, 3-phase, 60-cycle, 2400 volt alternators; one 1200 hp, model 33F 16 engine with a 840 kw alternator; and one 875 hp,

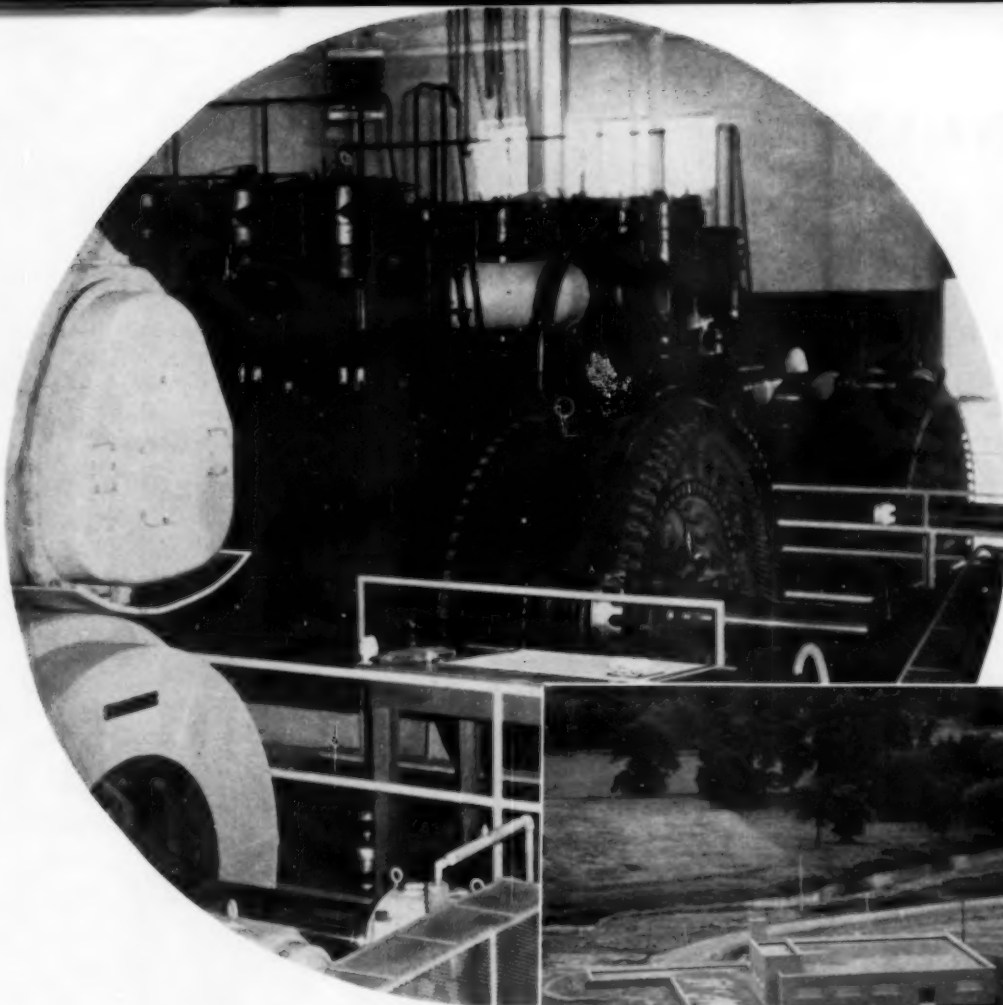
model 33D 16 engine with a 600 kw alternator. It is the two 1920 hp units, put into operation in the late summer of 1956, that carry the bulk of the load. Since that time—approximately 20 months—each has operated approximately 6000 hrs. at an average load factor of 80 percent to produce a combined total of 13,000,000 kwh at an average fuel consumption of close to 13.5 kwh per gal. The next fiscal report should show an even better fuel consumption for these two engines since the 13.5 figure includes the first year of operation when these engines operated at a lower load factor and averaged 12.84 kwh per gal. In the last year for which full operating figures are available, July 1, 1956 to June 30, 1957, the Grafton municipal plant produced 9,745,100 kwh for a generating cost of \$123,175.55 or \$.012639 per kwh. Total cost including generation, distribution, administration and depreciation came to \$193,812.33 or \$.01989 per kwh. In evaluating these figures, it must be remembered that no source of cheap natural gas is available to the town and the engines run entirely on fuel oil for which the light department pays \$.11102 per gallon. With the plant averaging 12.66 kwh per gal., fuel costs for the year came to \$.00877 per kwh. Net profits from the operation of the plant for the year ending June 30, 1957, came to \$46,984.31. This figure would be considerably higher and the total cost per kwh of \$.01989 would be considerably lower if Grafton followed less conservative depreciation practices. Instead of using the common depreciation rate of 20 years for its engines, for example, Grafton writes them off in 15 years—one fourth faster. With depreciation of plant and equipment representing 22 percent of total operating costs, this shorter period of depreciation represents a sizeable deduction from net profits—but only on paper. The money is in the bank and the heavy duty diesels will do their job for decades.

Since 1930 (when the city abandoned operation of the small steam plant it purchased in the 1890's and switched to diesel engines) the municipal light plant has earned a total of just over \$1,400,000. The record has been one of steady growth—in generating capacity, contributions to the city and in net profits. The two 540 hp diesels that went into operation in a new building in February 1930 were supplemented in 1932 by a 630 hp engine, in 1936 by a 875 hp unit and again in 1948 by a 1,200 hp engine. In 1954 Grafton was faced with a growing demand for electricity that was rapidly approaching plant capacity. On the basis of an engineering survey by North Central Engineers of Fargo, N.D., covering anticipated requirements for the next 10 years, the town decided not only to enlarge its municipal power facilities but to construct a completely new plant. The new yellow brick and stone power plant is set on a large tract of land outside of town, adjacent to

the new water treatment plant. Into this building in the winter of 1955 the city moved the 875 hp and 1,200 hp F-M diesels purchased in 1936 and 1948 and two new 1,920 hp Fairbanks-Morse O-P's. Accessory equipment for the two older engines was retained and moved to the new plant site.

A closed cooling water system is used for all four engines. The two new 1,920 hp O-P's employ evaporative coolers to cool jacket water. In the case of both the 875 and 1,200 hp units, a motor-driven centrifugal pump circulates water through the engine jackets and a heat exchanger. Raw water circulates through these exchangers and an induced draft cooling tower which was moved from the old plant to the rear of the new building. The new F-M diesels exhaust through vertical silencers located at the rear of the plant; scavenging air is drawn through viscous impingement filters mounted on the roof directly over the engine blowers. The two older engines are equipped with both intake and exhaust silencers positioned at the rear of the plant alongside the new vertical silencers for the 1,920 hp units. Along with accessory equipment, three fuel tanks were moved to the new light plant site. To these were added





The new building for Grafton's municipal light plant includes besides two new O-P engines, two older F-M units which were moved to the new site from the old plant. They are a 875-hp and a 1,200-hp engine.

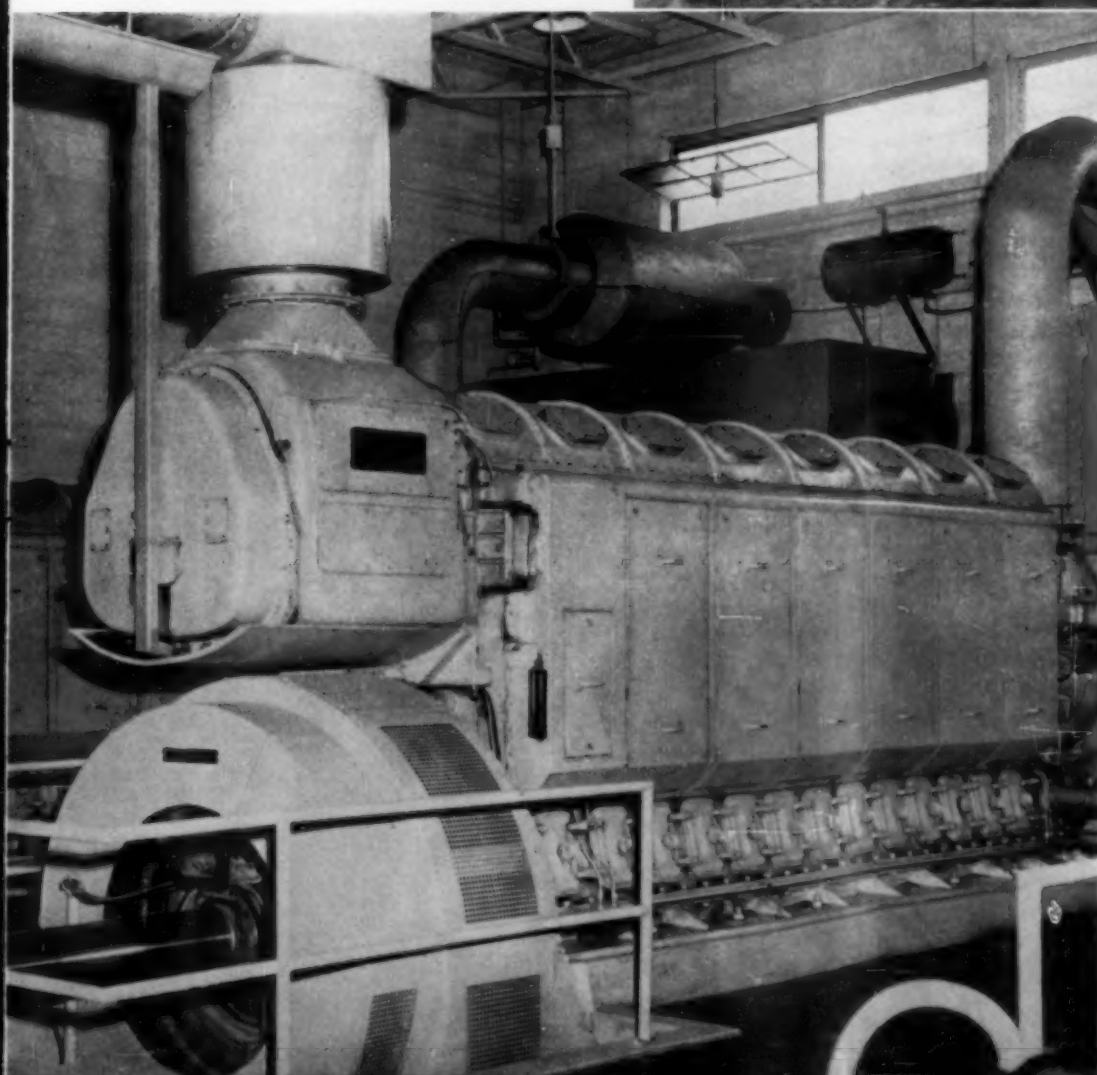
new vertical cylindrical tanks with a capacity of 30,000 gal. There are two starting air compressors in the Grafton plant—one motor-driven and one driven by a gasoline engine. Both were transferred from the old to the new plant. The 15-panel switchboard, however, is new. A well instrumented board, it includes totalizing and recording meters.

At present the bulk of Grafton's municipal lighting load is residential with 5,105,553 out of the total of 8,314,885 kwh sold in the fiscal year 1956-1957 going for residential lighting and water heating. Numerous plans are afoot, however, to build

The new Grafton municipal light plant is located outside of town close by the town's water treatment system. It houses four Fairbanks-Morse engines totalling 5915 hp.



Two new efficient 1920 hp Fairbanks-Morse opposed-piston diesels carry the bulk of the load and have cut costs in Grafton's new plant.



up the town's business and industrial activity. Grafton is North Dakota's largest potato shipping center and Walsh County in which Grafton is located is among the top ten potato producing counties in the United States. Within the city there is storage space for more than a million bushels of potatoes. A new potato starch plant has been built adjacent to the new power plant and was placed in operation this year. Sugar beets are another volume commodity of the region and a sugar-processing plant is under consideration for Grafton. So too is a straw-processing plant. The Grafton light plant is ready as well for this industrial growth as for a continued steady population growth. In building its new plant for a present 5,915 hp capacity, the town allowed room for the addition of yet more generating units.

80 HP ENGINE ADDED BY CUMMINS

**Four Cylinder "J" Series Diesel Enters Production
Following Five Years of Development and Testing;
Broad Field of Application Predicted for J-80 Engine.**

By ROBERT E. SCHULZ*

COLUMBUS, Indiana—Alert to the increasing market for heavy-duty, versatile engines in the lower horsepower range, Cummins Engine Co. this month introduces a new 80 hp diesel, designated model J-80, that has a significantly wide field of application. Here in Columbus, I had the opportunity to observe production of this new engine and discuss its development and markets with engineering and sales personnel. In work since 1953, the J-80 is another sound step by the Cummins people and successful test applications predict an excellent potential. Designed for rugged, continuous duty, the new engine possesses fine operating characteristics, and its sales are targeted into the original equipment market and after market as well. In test applications over the last year, the J-80 has been successfully installed in farm and crawler tractors, small shovels and cranes, graders and rollers, and has powered irrigation pumps, compressors and generators. Indicative of its future application also is its use in city buses and trucks. Cummins officials point to this latter application as one of the potential key markets for the J-80, as the trend to dieselization step up its pace among truckers with large city fleets. Chief application at the present time centers in the farming, construction and irrigation markets. It is equally well suited for both pleasure and work boat propulsion.

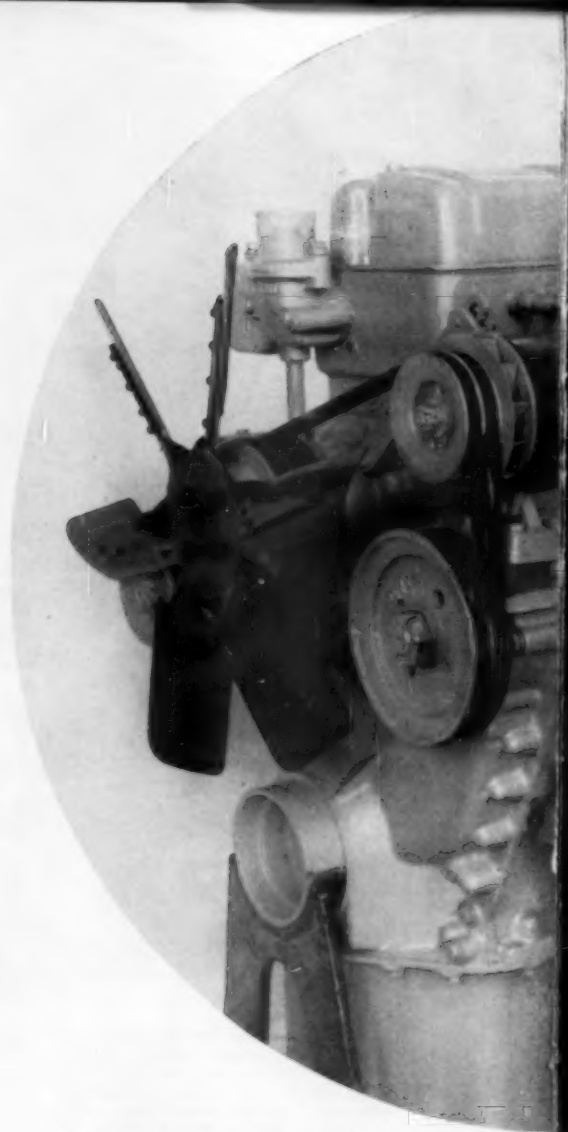
A four cycle, naturally aspirated engine, the J-80 has four cylinders of $4\frac{1}{8}$ in. bore and 5 in. stroke with a 267 cu. in. piston displacement. It develops its rated horsepower at 2500 rpm and has a maximum gross torque of 198 lbs. ft. at 1300 rpm. Weight with standard accessories is 1150 lbs. or 14.375 lbs./bhp. Cummins engineers point to the construction simplicity of the J-80, its lack of vibration due to full counterbalancing and its fuel efficiency, consumption being fairly constant over the entire operating speed range, as its key features. In the horsepower and torque curves illustrated, performance was recorded when operating on No. 2 diesel fuel and represent maximum bhp and torque corrected to conditions of 29.92 in. of mercury and 60 degrees F. intake air temperature.

Design and construction of the new Cummins engine in many ways is similar to its other in-

line models, especially the J series. An open type combustion chamber is used, but only two overhead valves per cylinder, each of $1\frac{1}{2}$ in. dia., with a stellite insert used on the exhaust valve seat. Cummins own PT fuel injector system is employed with injection, camshaft controlled. Fuel spray is introduced directly on top of the piston dome assuring complete fuel burning and resulting efficiency. Fuel pressure in this system is never more than 260 lbs./sq. in. nor less than 80. The cylinder block takes a wet type liner and the piston, produced from lightweight aluminum alloy, has four rings, three compression and one oil. Pistons are cam ground with knurled skirt for maximum cylinder wall lubrication. Connecting rods are alloy steel with an I-beam section and the piston pins, $1\frac{1}{2}$ in. in dia., are full floating. Crankshaft of the J-80 is machined in the company's recently acquired Fostoria, Ohio plant and all journals are induction hardened. With five main bearing journals of $3\frac{7}{8}$ in. dia. and the crankpin journals $2\frac{3}{8}$ in. dia., sufficient material is allowed for several regrinds. Bearings, as in other Cummins engines, are of the steel-backed, copper-lead type. The camshaft is geared to the crankshaft for positive control of all valve and injector movements and roller type cam-followers are used to minimize wear. The J-80 uses a full-pressure lubrication system, with the gear pump conventionally located in the oil pan and all journals rifle-drilled. A full-flow cooling system is used with large volume water passages. The centrifugal water pump is belt-driven, rated at 50 gpm at 2200 rpm, and the thermostat is of the single unit type.

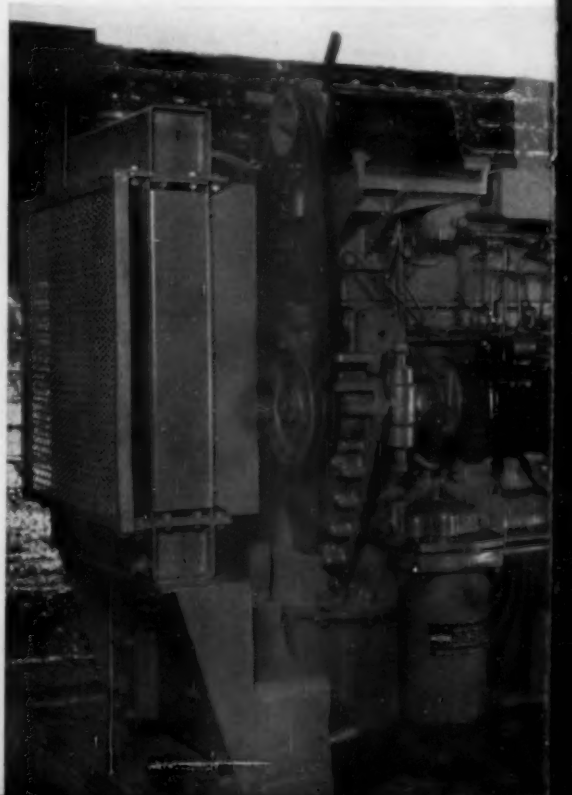
The J-80 has a 12 volt electrical system, now generally standard, with starting motor, 30 ampere generator, voltage regulator and key type starting switch, Delco-Remy being the major supplier. Designed to accommodate Twin Disc, Borg Warner and Allison torque converters, the engine is also available with clutch power take-off and outboard bearing for chain and belt drives and is offered with a skid type base for all power unit and generator set applications.

Cummins officials are enthusiastic as they head into production of this smaller engine and plans are already made for the later turbocharging of the J-80 which would boost its power output approximately 50 per cent. A companion model, the

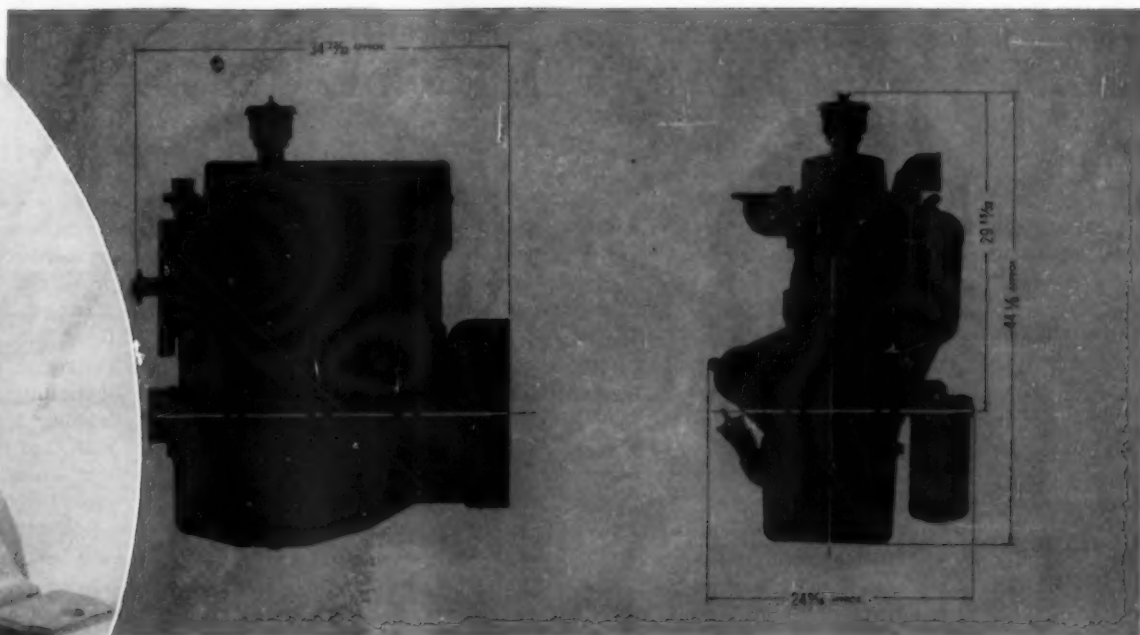


Fuel injection side of the new J-80 Cummins diesel also showing the Delco-Remy generator. Engine is designed to accommodate Twin Disc, Borg Warner and Allison torque converters.

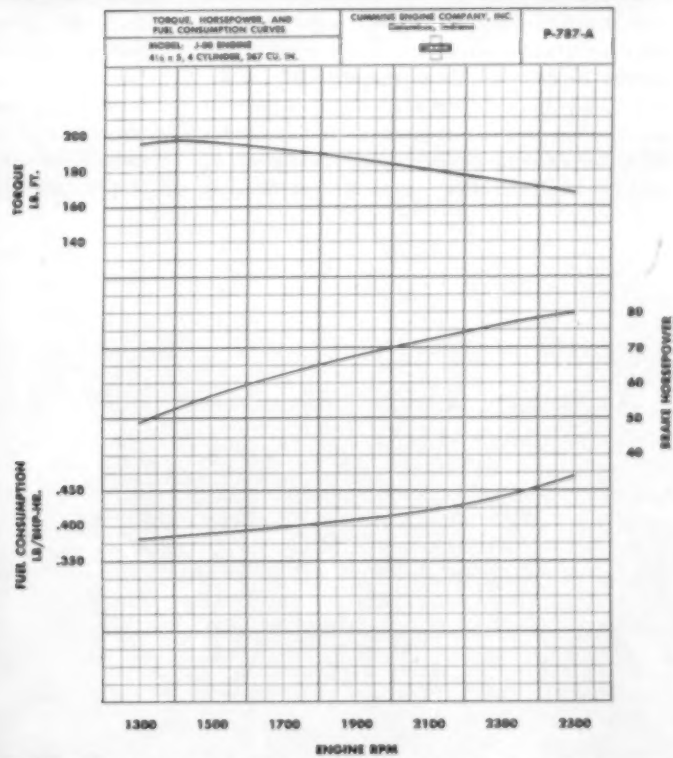
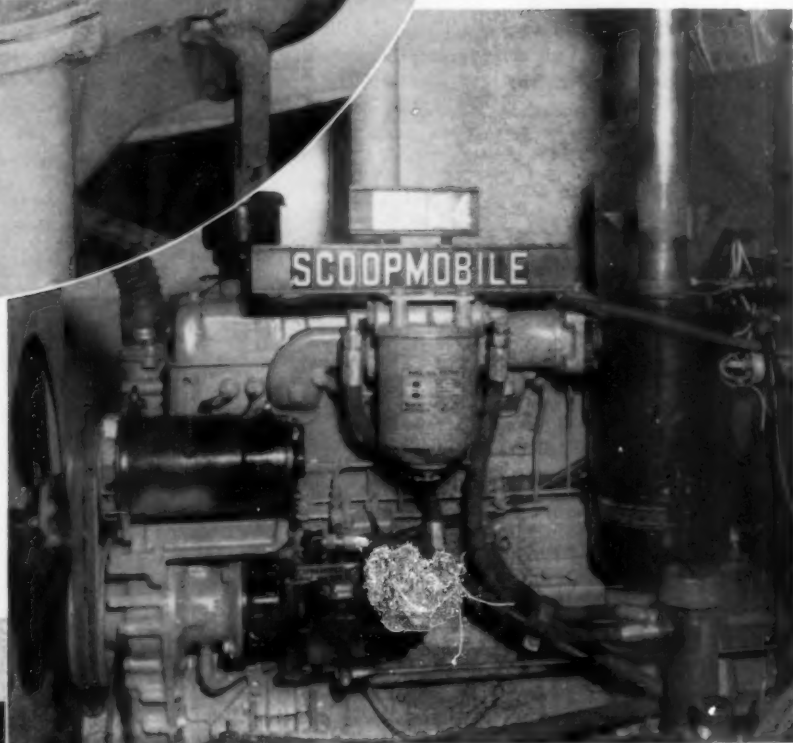
J-70, is also being released. This engine is rated at 70 hp at 2000 rpm and is identical in specifications to the J-80 with exception of oil cooler and vibration damper. This model is being made available for applications requiring a maximum of 70 hp.



*Managing Editor, DIESEL PROGRESS



Basic dimensions of the J-80.



Mixermobile's 4-wheel drive Scoopmobile loader powered with the new 80 hp Cummins engine.

Designed for irrigation service, the J-80 engine-centrifugal pump unit is rated 500-750 gpm under normal high pressure in spray type system. Radiator is Perflex and air cleaner, Donaldson.

Mobile J-80 engine generator set serves Pan American Airways at Idlewild, N.Y. airport. Diesel drives a 30 kw generator.



NEW, SIMPLIFIED FUEL INJECTION PUMP

THE new American Bosch type PSH fuel injection pump for diesel engines was developed to meet requests for a lower cost, more compact pump while retaining the proven performance of the company's well-known PSB pump, of which there are now nearly 200,000 in service. Although designed for lower cost and simplified servicing, it is built to the same precision standards as other American Bosch injection equipment. The reduction in size and cost was accomplished through an improved filling system, the elimination of a number of parts, and the designing of parts which can be produced more efficiently. The PSH, like the PSB, has an easily replaceable hydraulic head incorporating a single plunger and single delivery valve. The plunger is actuated by a multi-lobed cam and rotated continuously to serve as a fuel distributor. However, the PSH employs an annular-fill design which reduces the plunger stroke from 6 mm (for the PSB) to 3.5 mm. This reduces the size and amount of material required for the head. It also reduces the amount of lift required of the cam and consequently its size. For comparison, the PSH is approximately

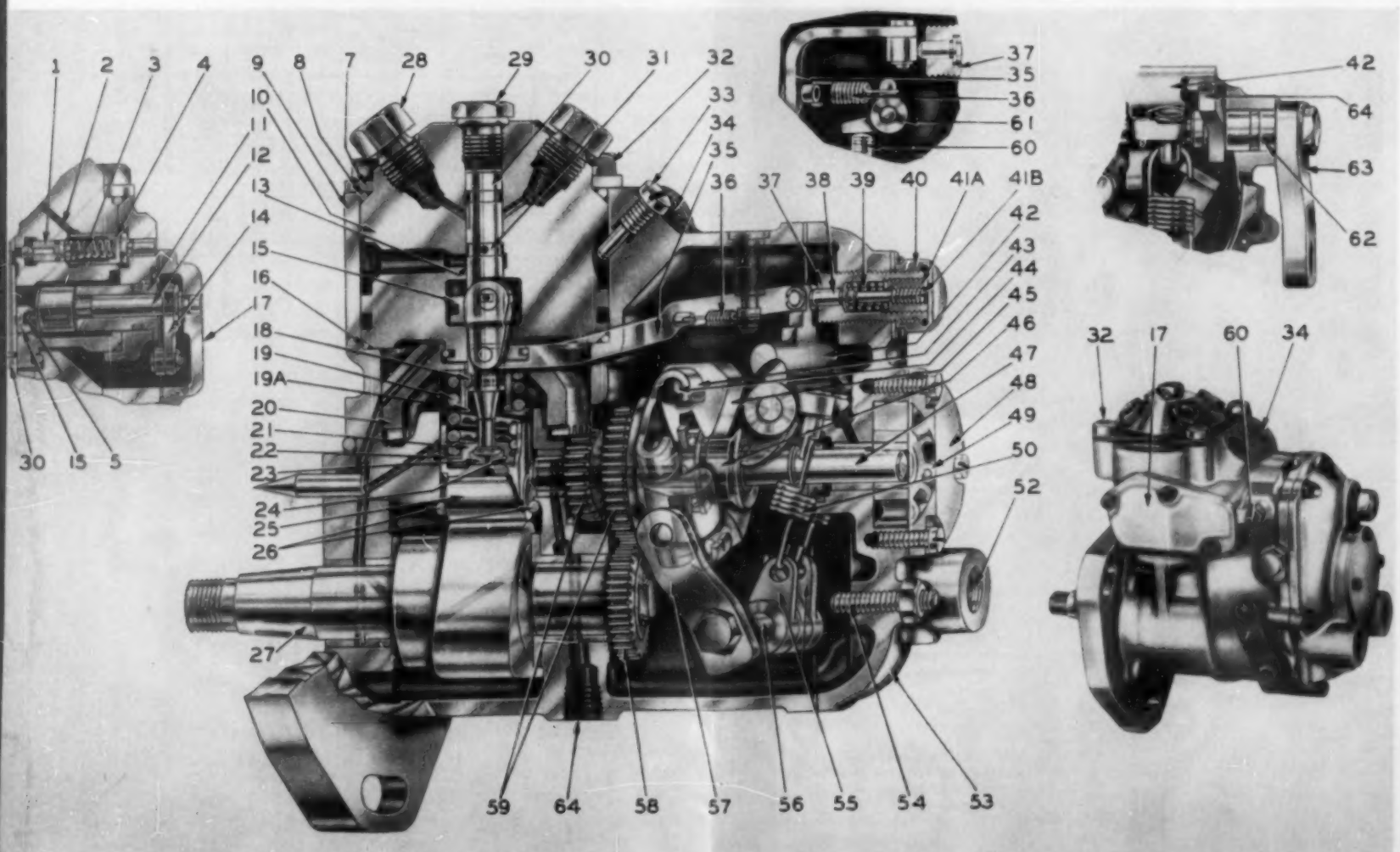
3½ in. shorter and 1½ in. less from drive shaft center to top than the PSB. Weight-wise, the PSH tips the scale at 10¾ lbs. as against 20 lbs. for a similar PSB model. There are approximately 100 fewer parts in this new pump.

The PSH (see Figure 1) consists essentially of a housing (9) with drive mechanism, a hydraulic head (10), a variable speed governor of the mechanical centrifugal type (45) and a positive displacement, self regulating, flexible vane type supply pump (48). All adjustments, idle fuel, full load fuel, torque back-up, and full speed are easily accessible on the outside of the pump. Housing is an aluminum casting that is available with a choice of mounting flanges. For engine speed drive, the camshaft (27) has two lobes for a 4 cylinder pump and three lobes for a 6 cylinder pump. For half engine speed, the camshaft has four lobes for 4 cylinder pumps and six lobes for 6 cylinder pumps. Camshaft gear (58) drives the governor shaft gear (59) which, with its second set of teeth, in turn drives the plunger drive gear (20). Tappet shell (22) serves as the bearing for the

roller, cam follower (25). The tappet shell is prevented from rotating by two steel pins (26) which guide the roller. Lubricating oil is supplied under pressure to a groove in the tappet shell and, by ducting to the cam follower and the plunger base. In addition to providing pressure lubrication to the tappet, the pump housing is drilled to direct lubricating oil under pressure to the camshaft bushings and their thrust faces, to the governor shaft, and to the plunger drive gear. Cam, gears and other mechanism in the housing are lubricated by oil splash. Control unit assembly is comprised of a flanged bushing (11), a lever shaft (12) with an eccentrically positioned pivot pin (5), and a lever (14) all held in by the cover (17). The eccentric pivot pin engages a closely fitted slot in the plunger metering sleeve (15). The control lever is attached to a governor link rod (35) which is actuated by the governor.

The hydraulic head (10) is a complete assembly comprising the head, a plunger (30) with its metering sleeve (15) plunger return spring (19) and plunger drive gear (20). The head has a central

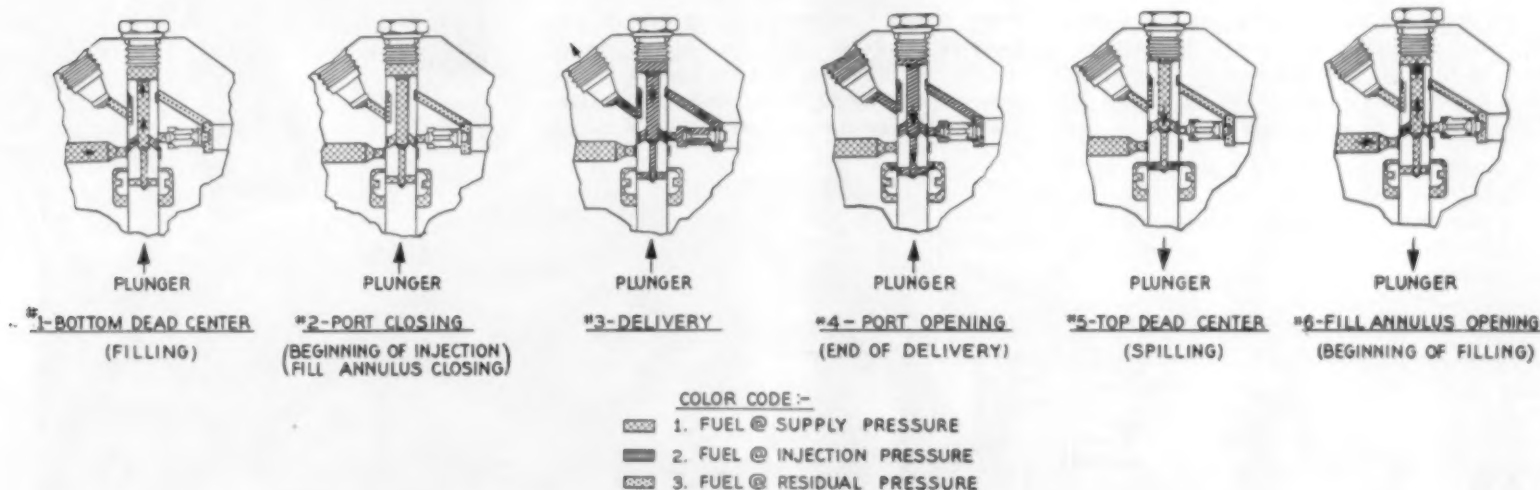
Figure 1



bore that is ground and lapped to receive the single plunger. Circumferential grooves on the outside diameter of the head connect with the fuel inlet (34) and vent connections to form a fuel sump between the sealing "O" rings (8 and 16). In the top of the head are fuel outlets (28) shaped to receive fittings for 1/4 in. O.D. tubing. The single delivery valve (1) is fitted directly into the head and the delivery valve spring (3) is retained by a piston (4) which also closes the delivery valve bore. The plunger is lapped and individually mated to the hydraulic head and the fuel metering sleeve (15). Plunger drive gear is a face gear that rotates the plunger through the drive pin (18). In operation, the fuel enters the sump through inlet

speed increases, the flyweights move outward actuating the governor sleeve (46). This motion is transmitted to the fulcrum lever (42) and is resisted by the two governor springs (50). Any motion of the governor weights and sleeve is thus correspondingly transmitted to the fuel metering sleeve (15) through link rod (35). The manual throttle operating shaft (56) carries an operating lever (57) on the outside with the governor spring levers (55) on the inside. Springs are hooked at one end to the spring levers and at the other to the fulcrum lever. This operating shaft assembly controls the speed and load positions of the metering sleeve. Positioning the full speed screw (54) limits the maximum pump speed and maximum

interchangeability with APE type pumps. The third mounting flange is the same as the 1.625 in. dia. distributor mount known as S.A.E. No. 6 and is intended for half engine speed drive for distributor mounted pumps. Actually, either of the first two flanges may be supplied with either engine or half engine speed drive. The flange mounted pumps are preferably driven by means of drive gears furnished by the engine manufacturer. Present limitation on speed is 3000 rpm of the engine crankshaft or 10,000 pump injection strokes per minute, whichever is the lesser, for full load speed. The basic pump may be provided for camshaft rotation either in a clockwise or a counter-clockwise direction. Maximum permissible injec-



(34), flows into the radial bores communicating with the groove (13) in the plunger bore. As excess fuel is always being provided by the supply pump, the excess quantity flows around the sump back to the main fuel tank. In doing this, it cools the head and also removes any air bubbles that might be present. Fuel enters the space above the plunger when a groove (31) in the plunger uncovers the mating fuel sump groove in the head and passes through the central bore in the plunger. On its upward stroke, the plunger closes the head groove, thus trapping the fuel and building up pressure until the delivery valve is lifted. Fuel then passes through the plunger via the delivery valve bore to the upper annular groove which connects with the vertical slot on the plunger. This vertical slot communicates (on successive working strokes) with each of the outlet ducts in the head so that this portion of the plunger serves as a distributor. Rotating and reciprocating motions of the plunger are so phased in relation to the outlets that the vertical plunger slot overlaps only one outlet duct during the effective pumping portion of each stroke. Quantity of fuel discharged by the pump is regulated by the vertical placement of the plunger sleeve (15). Maximum fuel is delivered when the sleeve is in its highest position and no fuel is delivered when the sleeve is at its lowest position. Head assembly is easily removed.

The mechanical, centrifugal governor is mounted on a separate shaft (47) and driven at engine speed. It consists of three flyweights (45) with their pivot pins (44) mounted in a spider (43). As pump

fuel delivery is limited by adjusting the full load screw (37). The engine speed during idle is controlled by adjusting screw (60). The forward end of the idle spring (36) is connected to the governor link rod (35) and the other end to a bell crank (61). During normal operation of the pump, the full load screw (37) and the torque control pin (38) limit the maximum fuel quantity delivered to the outlets. To obtain a fuel increase with a drop in speed, or a torque back-up, a spring (39) is located behind pin (38) and a resilient stop thus provided. The starting point of the torque back-up is adjustable through the preloading of the spring (39) by its adjusting screw (41A). Rate of torque back-up is controlled by the spring rate and the maximum back-up is obtained when the pin reaches its adjustable stop screw (41B). The shut-off shaft (62) is operated by external lever (63). Supply pump is located in a bore in the end of the governor cover and is driven by the governor drive shaft (47). It has a flexible vane type impeller (49) which permits priming directly through it without by-pass valves. Impeller may be installed so as to rotate in either direction equally as well.

Three types of mounting flanges are available. The first is a duplicate of the PSB mounting flange and is intended for use basically with engine speed drives and to permit direct interchangeability with present PSB installations. The second mounting flange is the same as the S.A.E. No. 5 flange and provides a three hole mounting to be used with half engine speed drives for direct

tion pressure, measured at the pump end of the discharge tubing, is 7000 psi to insure a reasonably long life of tappet rollers and cam lobes. The PSH pump is applicable to engines requiring up to 100 cu. mm./injection stroke at full load speed. Basic pump is made with plunger diameters of 8.0 and 10.0 mm. and with effective cam lifts of 2.0 and 1.6 mm. providing the equivalent of a 7.0, 8.0, 9.0 and 10.0 mm. plunger of the PSB.

The American Bosch PSH pump, being engine oil lubricated, will handle various types of fuels such as #1 or #2 fuel oil, gasoline, kerosene, JP3 or JP4 fuels. It is also applicable to various types of combustion chambers of either the open, pre-combustion or energy cell types. The PSH has a "reduced" volume hydraulic head which reduces the total parasitic volume of fuel oil in the high pressure sides of the system. This tends to lessen requirements for automatic timing by reducing injection lag. It also provides maximum injection performance and is especially important in open chamber type engines. Metering of the fuel is uniform to all engine cylinders and remains uniform without the need for balancing out or calibrating the amount of fuel distributed to the various outlets. Like the PSB, the PSH has a torque back-up feature which supplies a carefully predetermined quantity of extra fuel for extra "lugging" power when required. The pump will also be developed for V8 and V12 engines using twin heads arranged in a staggered "V" construction. This design will permit it to fuel either even-firing or odd-firing sequence engines.

DIESELS MOVE MOUNTAINS OF SNOW

ABILITY of diesel engines to handle power requirements with dispatch and efficiency is uniquely demonstrated in their application on the new rotary snow plow called Snowblast manufactured by the Edward F. Taylor Co. of Denver. Builders' tests observed by the Air Force, Navy, Corps of Engineers and the State of Colorado Highway Department show this plow to have an efficiency factor of 10 tons of snow per hp/hr., which is $2\frac{1}{2}$ times that of any other plow operating under the same conditions. Great versatility is one of the prime reasons for the great efficiency of the Snowblast which depends on two diesels for rotary plow and motive power. Built for the State of Colorado and delivered in January of 1958, the Snowblast model 444-3520-102 consists of two basic units, the rotary snow plow and its car-

avalanche snow at less than .2 mph. Avalanche snow can build up in excess of 55 ft. in depth with weights up to 45 lbs./cu. ft., with a penetration resistance so great that a sharp pencil must be pounded into the snow by the heel of the hand. Avalanches of this type have been known to push crawler tractors off the highway and roll them 800 to 900 ft. down to the bottom of a canyon.

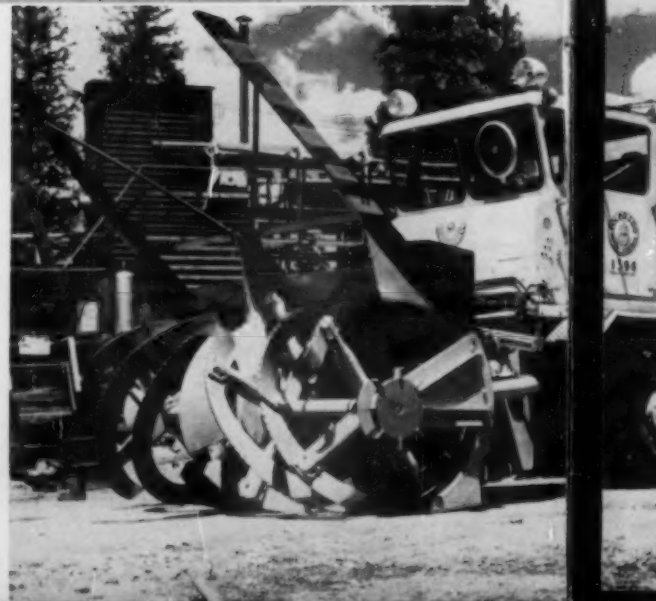
The torque converter that operates with the Cummins engine is a Clark C405V Transverter transmission. It is a 13 in. torque converter and operates through a hydraulic disconnect clutch. The Coleman carrier or truck, has an axle size of $2\frac{3}{4}$ in. over the spline and the housing for the axle was built for 22,500 lbs. load. The Coleman carrier furnishes the only one piece full floating



The Snowblast with hoods up showing the 165 hp Cummins engine in the rear compartment, the 190 hp turbocharged Caterpillar diesel and the 5 kw emergency light plant to its right.

rier, each of which is independently powered. The former is driven through a Wichita air clutch and two speed Western Gear transmission by a Caterpillar D337 turbocharged engine that develops 190 hp at 11,000 ft. altitude. Carrier for the plow is powered through a torque converter Cummins model NH 180 diesel rated 165 hp, 2100 rpm at the same altitude. The versatility of the Snowblast system allows this equipment to plow snow of 4 to 6 in. in depth weighing from 4 to 10 lbs./cu. ft. at speeds up to 35 mph. It can also plow enormously deep and extremely difficult

steerable driving axle and the power from the axle shaft goes through a power yoke and compensating ring to the wheel. The carrier further is fitted behind the torque converter with a two speed "creeper" gear box, a two speed transfer case and a five speed gear transmission. There is a total possible mechanical reduction of 700:1, using the low range of the creeper gear box and the transfer case and the lowest gear in the transmission combined with the full speed operation of the torque converter. Using the torque converter to its full capacity, however, it is possible



for a total reduction of over 1150:1, thus making it practical to plow at a rate of speed of less than .2 of one mile per hour. The torque converter included in this snow plow carrier or truck is so that it is possible to go from deep snow into shallow snow depths through a forward speed of from .2 mph to 1.5 mph without shifting gears. This is practical and necessary because in the plains country and certain high altitude mountain passes that are above timber line, "finger" drifts frequently streak across the highway, giving a dense difficult to penetrate snow for short distances in depths of three and four feet. After these drifts have been penetrated there sometimes is as much as one or two miles of highway that is virtually cleared and the snow leading up to and following the high point of the finger drifts stretches for 200 or 300 yards at each side. If it were necessary to shift gears with these changing depths of snow and at these extremely slow speeds when plowing the full

◀ Snowblast plows a mountainous highway in Colorado using a short cast.



▲ Closeup of the D337 Caterpillar engine and Garrett AiResearch turbocharger. The engine drives the rotary plow through a Wichita Clutch and Western Gear transmission.

◀ Snowblast, with a total of 355 diesel horsepower, has an efficiency factor of 10 tons of snow/hphr.

height of the finger drift, which can build up to 6 or 7 ft., much time would be lost since a gear change at these speeds means a total stop due to lack of momentum of the truck combined with the forward resistance of the snow.

This particular unit is fitted so that it is a one man operation. Other than the normal truck con-

trols, there are three snow plow levers in the cab; one for raising or lowering the plow, one for controlling the direction of the chute and one lever *only* for shifting the gears in the snow plow transmission, engaging the clutch and accelerating or slowing down the Caterpillar engine. In addition, since the rear wheels are steerable as well as the front wheels, there is a vertical steering wheel located to the right of the snow plow operator with a lock out device. This provides crabbing action of the carrier when plowing avalanches or when plowing near the edge of the highway. It, of course, also allows the vehicle to turn around on the ordinary county road without having to move to an intersection. The 4-wheel steering not only allows the truck to move sideways, away from an obstacle, but allows the snow plow operator to widen the highway of blade-plow-built windrows of snow by traveling down the highway with the rear end of the truck offset toward the center line and the front end of the truck working near the edge of the ditch. This gives wider clearance and allows the snow to be removed further out on the shoulder without the danger of slipping into the ditch. The Snowblast operator sits in a cab just behind the snow plow, where he has a clear view of the work he is doing and the snow plow carrier or truck engine is mounted to the rear of the rear wheels which balances the weight of the snow plow in front of the front wheels. The turbo charged Caterpillar engine power unit straddles the two axles. Since the snow plow carrier truck torque converter, transfer case, creeper gear box and transmission are under the snow plow power unit they, in no way, interfere with the two speed snow plow engine. Not only this, the drive shafts from the transfer case to the axles of the carrier are short and of equal length and likewise, the drive shaft going to the rotary snow plow is short, only 3 ft.

Over the road speed of this unit is 45 mph. It is powered with diesel engines to take advantage of fuel simplicity on highway work and to also take advantage of fuel injection which overcomes altitude losses of power. Both the Caterpillar and Cummins engines are in common use in heavy duty highway equipment and ease of maintenance is well established. The rotary snow plow and carrier is fitted with a 5kw emergency light plant whose prime purpose, however, is to furnish heat to the engine coolant in the event the plow must be kept outdoors in extremely cold weather. Both engines are also equipped with glow plugs and this, combined with the heated coolant and as a consequence, warm engines, cold weather starting is no problem. Since avalanches and blizzards do cause emergency conditions and since the rotary snow plow is usually the first equipment that can break these traffic bottlenecks, the 5kw light plant serves effectively as an emergency lighting system.

The Snowblast system was developed in 1948 by Dr. Edwin Bucher, then director of the Swiss Snow Research Laboratory and Avalanche Institute at Weisflujoch, Davos-Dorf, Switzerland. This rotary snow plow has been engineered for American highways by a combination of efforts of the Edward F. Taylor Co. and Dr. Bucher's firm in Zurich, Rolba Company, Ltd. It is completely built in Denver, Colo., and engineered for North American highways and snow removal problems.

500 MECHANICAL REEFERS FOR PFE

By JAMES JOSEPH

ALL purpose"—describes the nearly 500 mechanical reefer cars (part of a whopping 1000-car order) soon to roll coast-to-coast under the Pacific Fruit Express banner. PFE's \$20,000,000 1000-car expansion for the first time includes mechanical reefers which are all purpose: (1) they can hold frozen food at zero and below (down to -10 degrees F.) (2) can hold fresh produce in the 35-60 degree range; (3) can backhaul dry cargo, as any box car (traditionally, reefers have carried frozen foods west-to-east, then dead-headed empty on the return leg). Says Southern Pacific, which with Union Pacific jointly owns PFE, "until now, mechanical refrigerator cars have been designed to handle only the growing traffic in frozen foods. But the new all-purpose mechanical reefer can haul dead freight on the return trip . . . thanks to metal flooring and sliding doors which permit pallet loading of general freight." Concludes a PFE man, "this versatility will cut the old, high costs of moving cars back home mostly empty."

By target date—Feb. 1959—PFE will be tracking 1714 dieselized reefers, the largest mechanically refrigerated fleet existent. Nearly 500 of the thousand car expansion are "super giant" 50 ft. reefers (cost: about \$24,000 apiece), their 7½ ton Carrier model 66-E-9 refrigeration gear powered by Detroit 2-71 diesels directly coupled to 15 kw, 18.75 kva brushless Delco generators. One experimental 50-footer carries an O'Keefe & Merritt generator, a no brush, no commutator, no slip ring unit with removable (and rechargeable) permanent magnets. Interestingly, though, the Detroit engine is book-rated 44 hp at 1800 rpm continuous, PFE specs call for a slower-going, longer-lived operation: 34 hp at 1200 rpm.

Another 500 PFE reefers (see DIESEL PROGRESS, Sept. 1958) are 40 ft. long, cost some \$20,000 per unit and are powered by 100-RDA Witte engines (2-cylinder, four-cycle, 18 hp continuous) driving brushless Electric Machinery generators (12.5 kw at 1800 rpm). Twenty-five of the 40 ft. reefers are Equipco refrigerated; 300 are refrigerated by Trane units and the remaining 175 cars are refrigerated by Carrier model 66E-11. The last of PFE's 50 ft. reefers rolled off assembly lines at Southern Pacific's Taylor Yard (Los Angeles) in mid-August of this year.

The new reefers are more heavily insulated, their air circulation more rigidly controlled than in older models. Cross-sectionally, for example, a typical car side from outside-in begins with the car's 12-gauge plate which is sheathed in moisture-proof barrier material, then overlaid with 3 inches of fiberglass. Atop this goes 2 in. thick blocks of fiberglass. There's an air space, then a sheathing

of masonite (¼ in. thick), and finally the car's tongue-groove wooden lining. In all, cargo is surrounded by about 7 inches of insulation. Circulation is just as precisely engineered. 4000 cfm of air circulates thru a car-wide, car-long under-roof air duct (about 5 in. deep), its aluminum bottom, forming the car's ceiling, cut with 125, 2 in. dia. diffusers. Thus, cold air circulates not only within walls and ceilings, but within the cargo itself. Strip heaters in the evaporator unit can warm cargo to a high of 70 degrees, if desired.

A Detroit 2-71 and brushless Delco electric-set is bulkheaded at one end of each 50 ft. reefer, in the same compartment which mounts: (1) a Carrier 66E-9 railroad refrigerator unit; (2) a 13-volt Sonotone starting battery for the diesel; (3) electrical switch box; (4) thermostat—which controls not only refrigeration but 6000-watt strip heaters built into the evaporator; (5) engine controls which, accessible via a grilled sliding door, stop or start the engine. Governed for continuous duty, the shock-mounted 2-cylinder Detroit 2-71 (with a 4¼ in. bore, a 5 in. stroke) delivers 34 hp at 1200 rpm (routinely, the engine operates non-stop, fueled from two, 250 gal. under-car tanks). The engine's dependability and ease of repair were prime reasons for its selection to dieselize the 50 ft. reefers (unit sub-assemblies are repairable or replaceable without major engine tear-down).

Delco brushless generator used is one of a line that extends from 10 kw through 200 kw in both 1800 and 1200 rpm speeds; 250 kw through 300 kw units are available at 1800 rpm only. This brushless generator has no commutator, brushes or slip rings. The conventional dc exciter with its com-

Ready to roll: string of 50 ft. mechanical reefers tracked and ready to go into operation, part of 1000-car order (500 of them are 40-footers).

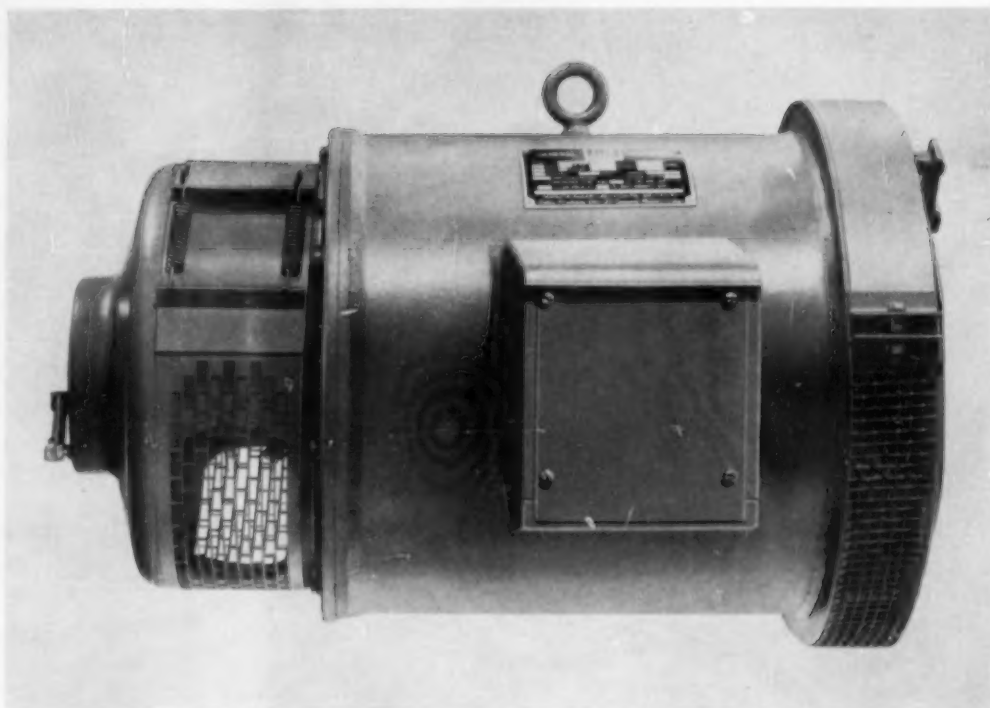
Engine controls, grouped beneath the Detroit 2-71's radiator and reached via a sliding compartment door, put within mechanic's reach all start-stop gear. One fuel tank is visible beneath car. Near man's arm is fuel-tank gauge.

mutator is replaced by an ac exciter. The alternating current output of the exciter armature is rectified by silicon rectifiers mounted on the rotating assembly; the resulting dc current is supplied to the field of the alternator. Since the exciter armature, rectifiers and field assembly form a single rotating unit, interconnected by solid connectors, all arcing contacts are eliminated. This provides an important safety feature as well as a rugged and dependable unit well adapted to the vibration and difficult operating conditions in a reefer car. Delco has produced a number of brushless generators for service in the oilfields and particularly in offshore drilling installations where safety features are important and have also found other applications in crushing plants and areas where dust and dirt are a problem, as well as in these reefer cars.

Mounted exteriorly—and visible both to car walkers and trackmen—is a “diesel-on” indicator light. Thus, with a glance, car walkers can tell if the electrical and mechanical systems are operative. The two under-car interconnected diesel fuel tanks, one hung either side and forward of the mechanical compartment, hold fuel enough (a total 500 gals.) to run the engine nearly 10 days without let up (the Detroit 2-71s burn about 1 gal./hr.).

Engine controls, grouped beneath the engine's radiator and reached via a sliding compartment door, put within a mechanic's reach all start-stop gear. At hand is a dip stick; a pull-to-start handle; cold-weather cranking aid (with Chevron capsule holder) and a pull-to-stop knob. Also accessible is a power stand-by plug-in: when car is yarded or terminated, it can be plugged into 3-phase yard power, relieving the diesel. Opposite the Detroit-

On Southern Pacific production line, a PFE 50 ft. reefer is shown being installed with its refrigeration unit. Already in place is the Detroit 2-71 with its Delco brushless generator in foreground.



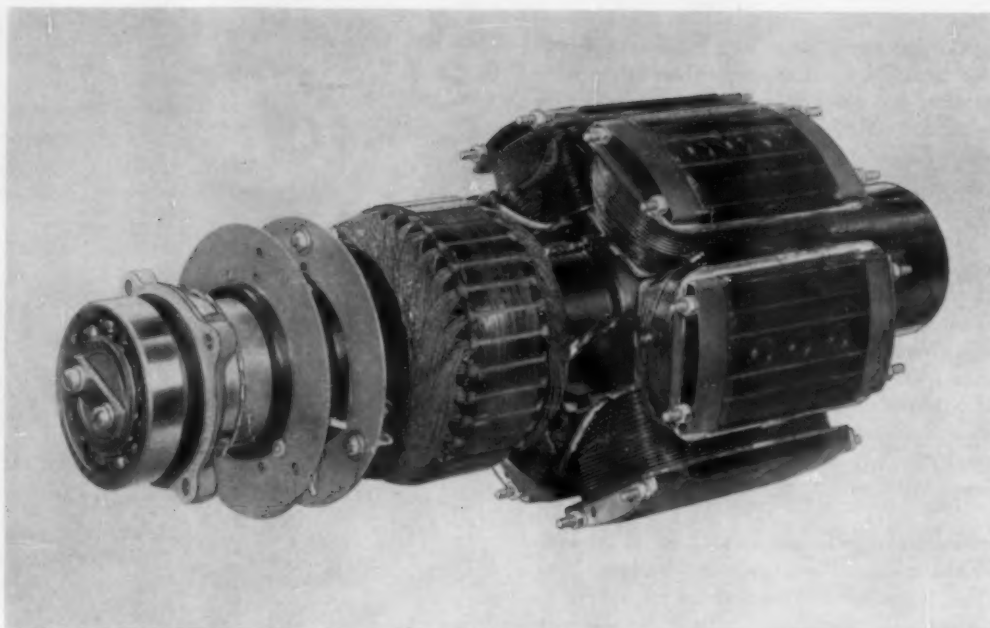
Delco 15 kw generator driven by GM 2-71 engine on the PFE mechanical refrigeration cars.



Delco electric set—and accessible via a sliding door—stands the shock-mounted Carrier 66E-9 refrigeration unit, its refrigeration medium refrigerant 12. Among its components: (1) a 10 hp, 4-cylinder compressor with a bore of $2\frac{1}{2}$ in., a stroke of 2 in.; (2) a condenser fan motor (10 hp), driving a 24 in. dia. axial flow aluminum fan; (3) condenser coils, the plate-fin type with $\frac{3}{4}$ in. OD copper tubes and .010 in. aluminum fins.

The system's evaporator unit (with $\frac{3}{4}$ in. OD copper tubes and .012 in. aluminum fins) is mounted in the mechanical section's bulkhead and is protected from shifting cargo by a unique pressed steel buffer. The buffer consists of steel angles ($\frac{3}{8}$ x 2 in.) rising the height of the car and running its width. Angles are spaced outward from the evaporator coil by 1 in. dia. pipe spacers. Over this protective anti-shift frame goes 1 in. of waterproof plywood. Above evaporator coils is the evaporator fan motor (1 hp), driving backward-curved aluminum fan blades mounted on shafts extending either side of the motor. Fans deliver 4000 cfm. Air is drawn up from the floor, pulled thru the evaporator coils (which also house strip heaters for defrost and heating), and discharges, chilled, into ceiling distribution ducts.

A -10°F to 70°F thermostat, mounted on the machinery compartment wall, is a specially designed two-step cooling, one-step heating. It's equipped

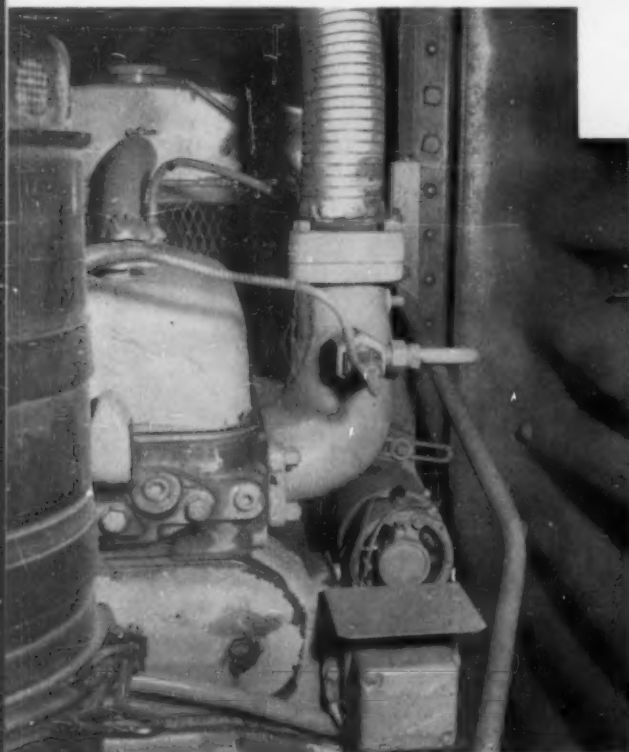


View of the rotating members of the Delco brushless generator used in the reefer cars. Silicon rectifiers are mounted on the plates at the left.

with a lock-out switch for setting temperatures below 20°F (below this point, both heating coils and compressor unloading are locked-out). When the diesel-electric set is started, the condenser fan goes into operation. As voltage builds, the evaporator fan motor is energized. After 20 seconds the compressor starts. Says a PFE spokesman of its new 1000-car, all-purpose reefer fleet, "already it's living up to all design claims. We haven't lost a load yet . . . and don't expect to."

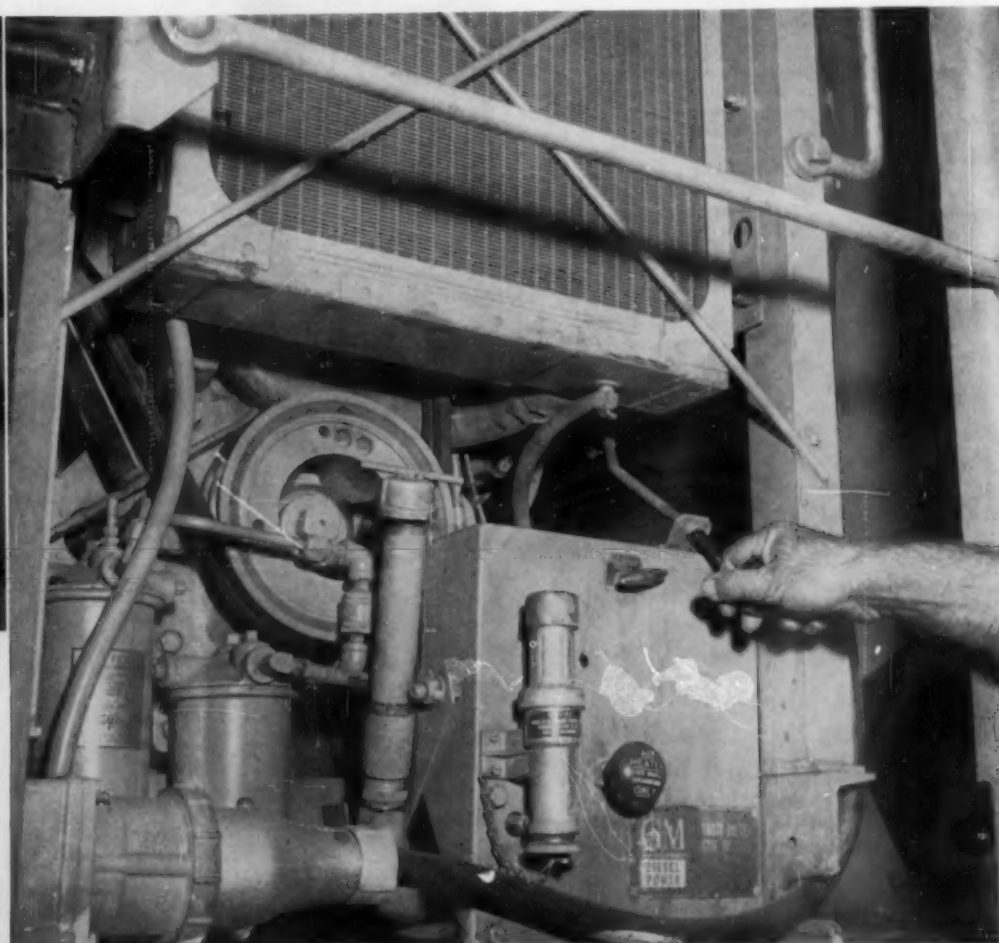
Principal Equipment Used (for 50-foot reefers)

| | |
|---------------------------|----------------|
| Engines | Detroit Diesel |
| Generators | Delco |
| Refrigeration | Carrier |
| Battery (engine start) | Sonotone |
| Fuel filter | Winslow |
| Temperature Control Panel | Vapor Heating |
| Switchboard | Westinghouse |



Detroit 2-71 diesel is mounted at one end of mechanical compartment. ➡

Engine controls. At hand is a pull-to-start handle; cold-weather cranking aid (with Chevron capsule holder) and a pull-to-stop knob. Also accessible is a power stand-by plug-in. ➡



NEW **WOODWARD** TYPE LSG GOVERNORS

Thoroughly dependable load and speed-sensing governors
for the most precise engine speed control ever obtained

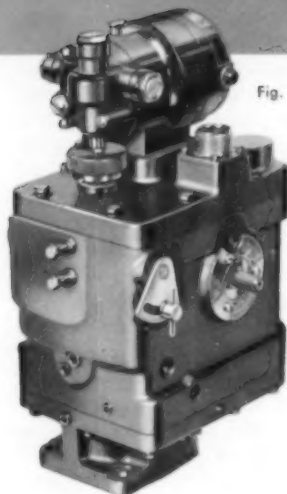


Fig. 1 Woodward type LSG-1 Governor

Woodward type LSG-10 Governor

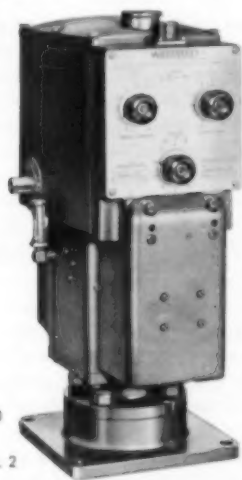


Fig. 2

After years of designing, and thorough field and laboratory testing on many makes and models of diesel engines, the first two sizes of the Woodward speed and load sensing governor are now available.

Woodward type LSG speed and load sensing governors permit the smallest possible temporary change in speed that can be obtained for any given load change on a particular engine. They cause proportional division of load between paralleled units, with isochronous control. Without adjustment, system speed remains constant regardless of load on a generating plant (within its capacity, of course). Steady state speed control is excellent.

While a portion of the governor system (the load sensing) is electric, it retains all of the safety, reliability and convenience of operation that has always characterized Woodward governors. The electric load sensing helps but can't hinder. The engine is under complete speed governor control and protection at all times including starting and during emergencies, such as loss of generator excitation, single or three phase short circuits, or damage to or failure of any internal or external part of the load sensing circuitry.

If, due to accident or carelessness, electrical trouble does occur in the governing system or elsewhere, it isn't necessary to shut down the engine and send for a governor service man. The speed governor will continue to control the engine with precision and safety.

Faster Adjustment

Operating procedures are almost the same as with conventional hydraulic governors — but simpler. In spite of this ease of operation, and limited only by engine characteristics, results are far superior to previously used hydraulic speed governors.

For smaller engines, the one foot-pound LSG-1 (Figure 1) is used. In response to a change equal to full rated load of an engine-generator set, it moves the fuel pumps to the necessary new position in about 1/100 of a second. This is so fast that on all but the highest speed two cycle engines with many

cylinders, the fuel pumps are in their new position before the next cylinder is ready to receive its fuel. The ten foot-pound LSG-10 governor (Figure 2) is required for larger engines. Its transit time is about 1/40th or 1/50th of a second, repositioning fuel for full load change faster than most larger engines can be ready to receive the changed quantity of fuel. Except for a few rather unusual installations, it is the engine rather than the LSG governor that determines how closely speed can be maintained following a change in loading.

Actual Test Results

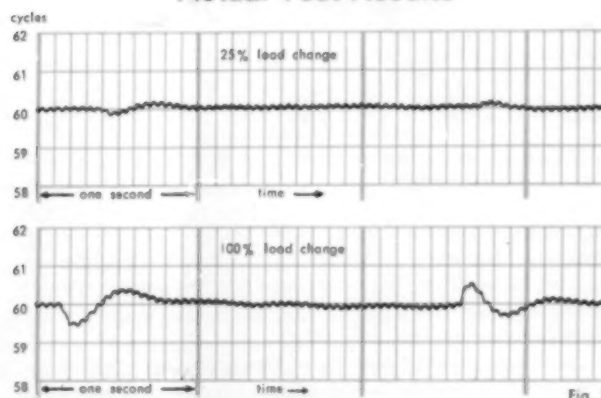


Fig. 3

Figure 3 shows the amount of speed decrease and rise measured when suddenly adding and removing resistance loads equal to 25% and 100% of rated engine load. Even with the full load change, speed is corrected in less than one second and the error is less than one cycle. Engine data: 1200 RPM, 60 KW, 220 volts, 3 phase, 6 cylinder, 2 stroke cycle, naturally aspirated, rate of acceleration 55% of rated speed per second, LSG-1 governor.

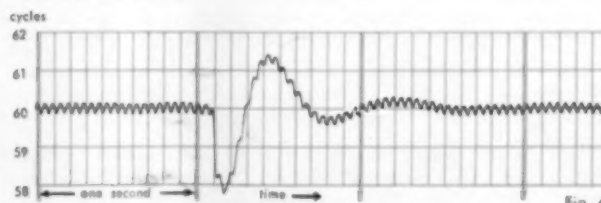


Fig. 4

Figure 4 shows the speed deviation obtained when applying a three phase short circuit on the generator.

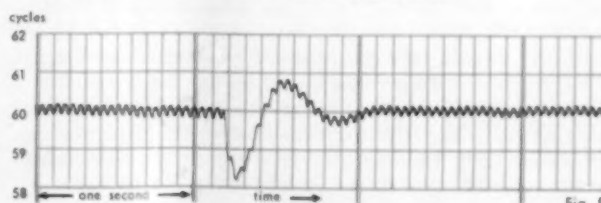


Fig. 5

Figure 5 shows the speed trace for a single phase short. Note that the speed stayed well within safe limits. There was absolutely no damage to any portion of the governing equipment.

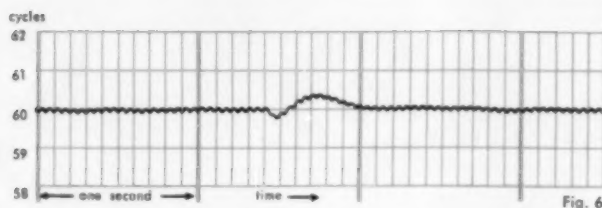


Fig. 6

Figure 6 shows engine speed and electrical conditions during starting of a 15 HP squirrel cage motor driving a dynamometer as an inertia load. The load computer circuit caused the governor to make the correct amount of change in fuel pump setting, even with low power factor and much more than rated full load generator current.

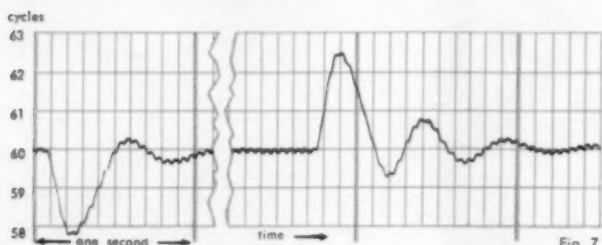


Fig. 7

Figure 7 shows a load change (resistive) of 100% on and off, with the load sensing portion of the governor out of service. Obviously, this ability to run an engine and make power regardless of possible damage to the governor's electrical system is an important reliability factor. Equally important is the safety resulting from the fact that the engine remains under good speed control in event of any kind of fault in the generator, power lines, load, etc.

On a slower speed four cycle engine, temporary speed deviations will be somewhat larger than shown unless a very large flywheel is furnished. This added inertia will keep the speed from changing so much before the next cylinder fires and produces the necessary new amount of torque. At the same time, however, this larger flywheel will increase the time that elapses before the speed returns to normal.

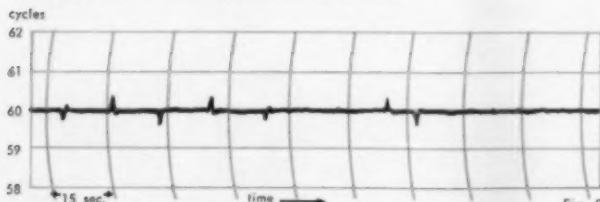


Fig. 8

Are the test results shown here accurate? Or, were speeds measured on a meter with so much damping that only a fraction of the true speed error is shown? *They are accurate.* The speed pickup on the engine was a permanent magnet type, 3 phase Bendix model 5, style A generator developing about 67 volts at 1200 RPM. The voltage developed was full wave rectified and passed through a filter with a time constant of only .017 seconds. The resultant DC was opposed by voltage from dry cells and the difference voltage applied to a Sanborn oscillograph, with response flat to 40 cycles per second. For comparison, please refer to Figure 8 made with the recording frequency meter often used for such tests. This shows transients caused by the same full load change as in Figure 3. Figure 8 looks much more spectacular but it just isn't correct! Demonstration of such rapid control as the LSG governor requires the use of precise and more rapid test equipment than has previously been required!

How Does the LSG Work?

First of all, it includes a high quality hydraulic speed governor, a baby-size version of the thoroughly proven Woodward type PG. The output of this governor moves one end of a lever, the other end is fixed. The center of the lever is connected to the fuel pumps. So far we have a good, conventional governing system. The other end of this lever really isn't fixed, though. It is connected to an oil-operated piston which can move it very rapidly. In this half of the LSG there is also a polarized solenoid which moves a friction-free balanced oil pilot valve and simple linkage, arranged so movement of the piston re-centers the pilot valve. The result is that this load governor piston quickly and accurately takes a position proportional to the solenoid current. Now all we have to do is take signals from the potential and current transformers of the generating unit, convert them to a small direct current corresponding to watts, and apply this current to the solenoid. When generator load changes, the fuel pumps are moved rapidly to the necessary new position. All this works very well, but it isn't quite enough.

As operating conditions change, there is a slight change in the fuel pump setting required to carry any given load. This can cause a small error in speed. The speed governor portion of the LSG feels this and moves its end of the lever—and hence the fuel pump control—the small distance necessary to return speed to the correct value. Also—if the governor only brought the fuel to the correct new setting, speed would return to normal very, very slowly. The small speed deviation that does occur after a load change causes the speed governor to act in its normal manner. This causes a greater change in fuel setting than would be produced by the load governor alone and gives the engine the boost needed to accelerate or decelerate quickly to normal speed.

The hydraulic speed governor portion of the LSG serves another very useful function. When alternating current generating units are connected in parallel, all of the speed governors are set to have speed droop. The exact amount isn't important. This causes the speed governor power pistons to always remain in the same position while system frequency is normal. In other words, the speed droop causes the unit to remain at a fixed load when conditions are not changing, as with conventional hydraulic governors. Yet, in spite of this stabilizing effect of speed governors with speed droop, a change in load on the plant causes the load governor portion of each LSG to take its proportionate share of the change and the net result is zero speed droop.

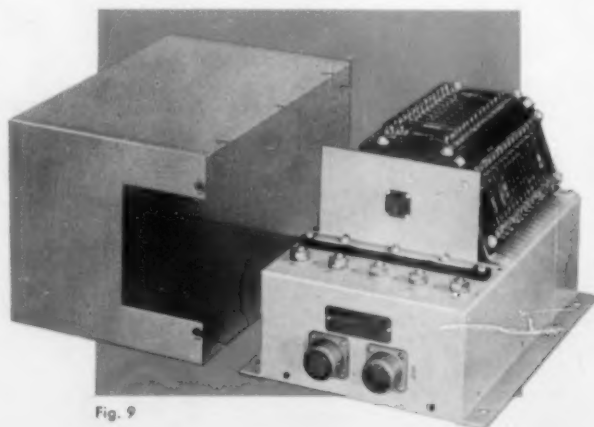


Fig. 9

We said earlier that we take a voltage and current signal (through the regular transformers) from the leads of each generator. These signals go into special transformers in our "Load Computer Box" (Figure 9) where the current signal is corrected for existing power factor and then rectified, the DC signal from the 3 phases being added together. This small DC voltage is amplified by a stable, conservatively rated, accurately calibrated, two stage transistor amplifier. The output of this amplifier goes to the coil in the governor. Where loads are always balanced, and power factor is always the same, simpler equipment is used.

Accurate load division is now obtained automatically by simple means. The inputs to all the transistor amplifiers are all connected together by the paralleling lines, so that the input voltage to each of them is the same and is an average of the DC voltages from all the transformer-rectifier circuits. Since all the transistor amplifiers are factory calibrated, the current will be the same to all the load governor coils.

Now that we're using governors with speed droop, and knowing that under varying conditions engines carry a given load at a slightly different fuel setting, how do we keep speed (or frequency) at exactly the desired value? It's easy. The output (power piston position in this case) of a governor with speed droop will take a definite position for each speed at which it runs. If it's running a little slow, its power piston will have moved some distance in the direction to increase fuel. If it runs fast, the piston will have moved in the direction to decrease fuel. The speed governor piston of the LSG operates two pairs of contacts, one if it has moved off center in the increase fuel direction and one in the decrease direction. These trimmer contacts in some one of the governors, are selected to serve for the entire generating plant by means of a master selector switch.

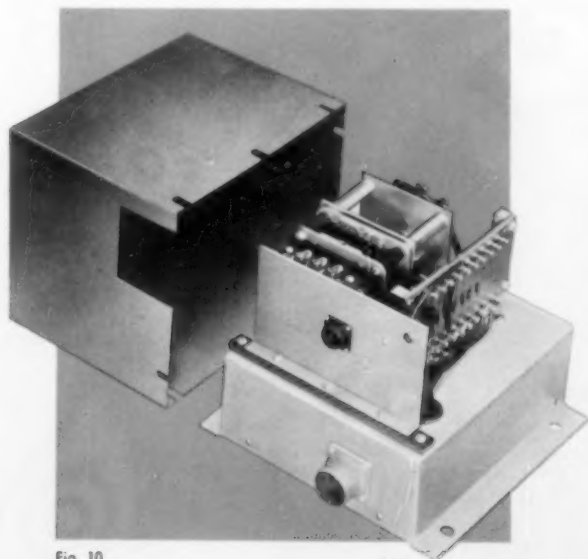


Fig. 10

If frequency isn't just exactly right after a load change, the high or low speed trimmer switch will close. This operates a very slow speed reversible motor in the trimmer assembly (Figure 10) which turns a rheostat to change slightly the current to the load governor coils of all the governors. This

causes the load governor pistons to make the small fuel change needed to bring speed exactly back to normal. Return of speed to normal opens the trimmer contacts in the governor which is used as the master. Depending mostly on the engine, the speed error could be quite small, even without a trimmer.

Operating Procedures

With conventional governors, the operator usually closes the unit circuit breaker with the synchroscope moving in the fast direction, say about 6 revolutions per minute. This machine is 6 cycles per minute or 1/10 cycle per second faster than those already running. If the governors have about 1½% speed droop (0.9 cycles out of 60), it will immediately pick up 1/9 or about 11% of its rated load. If the synchroscope is moving slower or if the governor has more speed droop, it will pick up less load when connected to the line. All operators are familiar with this. Next the operator raises the speed setting of the governor a small amount, waits several seconds, and then checks the wattmeters to see if he has picked up too much or too little load. He usually has to make one or two more adjustments and perhaps reduces load on one or more of the other units. All of this takes time, though it isn't difficult if the operator knows his business.

Things are simpler with the LSG governor. The operator synchronizes in the usual way. When the unit circuit breaker closes, the load governor circuit of the oncoming unit's governor is connected to that of the governors already in service. It immediately takes on its proportional share of the total power plant load, and the other units proportionately give up load. But — since the speed governor was set just a little bit fast, it too causes the oncoming unit to take on some extra load. Since there is no objection to using 3%, or even more, speed droop on a load sensing governor, this extra load beyond the unit's proportional share will be less than in the preceding example — say about 5%. It is desirable to lower the speed setting to get rid of this small extra load, and make the load division more exactly proportional. This is done semi-automatically with the LSG. On the switchboard panel for each generating unit there is a push button marked "Load Division Switch." It is only necessary to push this for a few seconds. It connects the speed adjustment motor of this governor to its own trimmer contacts. Since one of the other governors is serving as a master and holding correct system speed, and since the speed adjustment of the oncoming governor was a little high, its reduce speed trimmer contact will cause its motor to slowly reduce its speed setting. When movement of the speed governor piston opens this trimmer switch, the governor will be at the same speed setting as the master (and all the others) and it will have its proportional share of load. It's simple — no juggling of governor speed switches, no checking wattmeters, and no waiting. Just push the button while you count to ten.

The wiring required for one unit in a typical power plant is shown in Figure 11. This varies according to requirements of the particular plant. The current signal resistor assembly and load computer assembly (one for each generator unit) and the trimmer assembly (one for the entire power plant) may be mounted on the switchboard or at any other convenient place where there is reasonably adequate ventilation.

Load sensing cannot be used when an engine is connected to large power systems except by turning off the load sensing circuit and operating in the conventional way with the speed governor portion only.

Many Practical Applications

There are some special arrangements already suggested, and others that will occur, for which the LSG governor will be found very helpful. Assume a power plant interconnected with one or several others. There is also a local load with frequent large load changes, for example a steel mill with a power plant capable of producing most but not all of its own power. In such a situation it is desirable to take all of the local load changes at the local plant. Until now, it has only been possible to set all the governors in such a plant to have speed droop and thus carry constant load. Load swings had to be taken from the power line. By connecting the LSG load sensing circuit to the lines supplying the local load (rather than to the leads of each generator), the fuel to the local generating units will be adjusted automatically to match all local load changes.

How about prime movers other than the diesel engines? In a four cycle gas engine there is a time lag during the intake and compression strokes and in a two cycle engine there is a lag during the compression stroke. During this time, engine speed will continue to change, even though the governor has moved the fuel control quite rapidly to the correct new position. Depending on the particular engine, there can be a great improvement because, on gas engines, this lag requires a speed governor to be set to have an excessive amount of compensation for stability and this makes it sluggish. It isn't necessary to slow down operation of the load governor.

For smaller load increases and any load decrease on a turbo-charged diesel engine or a two shaft gas turbine, the LSG governor will improve performance. In many cases, however, these two prime movers can't accept a rapid increase in fuel, since there won't be sufficient air immediately available. Good results should be obtained on most steam turbines.

Installation, Adjustment and Service

Installing an LSG governor on an engine and adjusting it requires just one added step not previously required. Compensation is adjusted in the usual way with the needle valve.

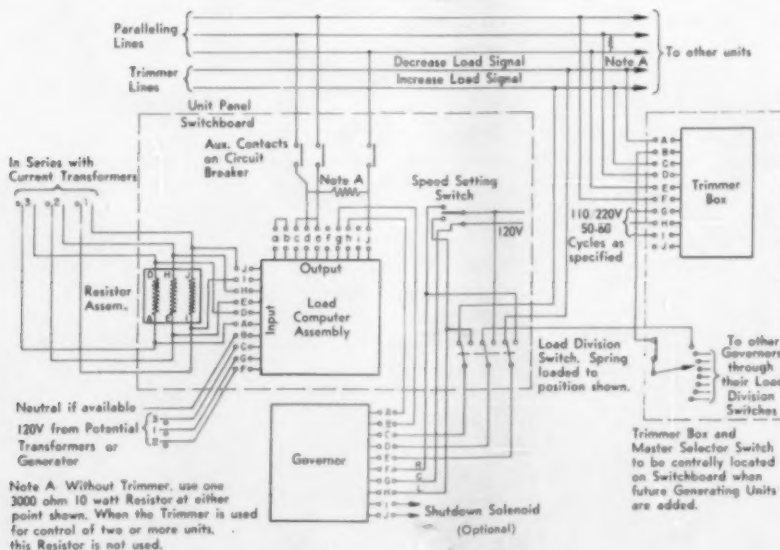


Fig. 11 Typical plant wiring diagram



WOODWARD GOVERNOR COMPANY
ROCKFORD, ILLINOIS

Fort Collins, Colorado

Schiphol, The Netherlands

WORLD'S OLDEST AND LARGEST MANUFACTURER OF HYDRAULIC GOVERNORS EXCLUSIVELY

On the side of the LSG-1 or on the dial panel of the LSG-10 there are marks indicating zero load and 100% (rated) load. Linkage furnished by the engine manufacturer must be adjusted so that under normal operating conditions the pointer will be exactly at zero when there is no load on the generator, and exactly at 100% at full rated load. This is important.

All internal adjustments in the governor, and all adjustments of the load computer assembly, current signal resistor assembly and the trimmer assembly are made in our factory. Because all parts are very conservatively rated, very little electrical maintenance may be expected. That which is required can be done without previous instruction by any thoroughly competent radio or radar technician using equipment normally available to him. We will furnish simple instructions when such service is needed.

Because it is a little more complicated than earlier governors, more care is required in overhaul, but it can be done by a competent governor mechanic. Minimum additional test facilities required are a low range and high range milliammeter, a rheostat, a few dry cells and two flashlight bulbs with sockets. It is desirable to use a governor test stand rather than to test and adjust on the engine. Such test stands are now quite widely distributed and easily available.

As always, Woodward's convenient exchange plan can be used when any portion of the equipment needs service. Factory calibration makes various parts of the system interchangeable.

Application of Load Sensing Governors To New or Existing Engines

In practically every case the application of a governor should be handled by the engine builder, who can furnish necessary mounting and connecting parts and do the necessary application engineering. Simple linkage change is needed on all engines. The LSG-1 has the same base and drive shaft dimensions as our SG and PSG governors, so no mounting change is needed when replacing these. The one foot-pound LSG-1 will not handle as large or as many fuel pumps as the more powerful SG (some SG's are one and some two foot-pounds) or the four foot-pound PSG. The ten foot-pound LSG-10 has available several mounting bases and drive shafts with dimensions the same as all of our other governors. It has sufficient work capacity to handle the control mechanism of all but the very largest engines which really do need the full power of our UG32. It is quite adequate for many of the engines now equipped with a UG32. We will have more powerful versions available in the future.

If you have a specific application in mind, ask for an application questionnaire of engine data. After the completed questionnaire is returned to us, we can calculate expected performance on your engines.

TURBINE-STARTED TRANSPORTS

First Commercial Jet Ground-Start Turbines Go to Eastern Air Lines

By JAMES JOSEPH

AIRESEARCH has rolled out the first of 43 ground-start gas turbines for commercial jets—the bleed-air/power units (AiResearch's dual-purpose model GTCP 85-91) destined to work with Eastern Air Lines' prop-jet Lockheed Electras, scheduled to take to commercial airways in mid-December. The lightweight (249-lb), compact (38-inches overall) turbines, mounted in panel trucks, will: (1) deliver some 116 lbs/min. of 50 psia compressed air for starting the Electras' main engines; (2) drive a 400 cycle alternator supplying 90 kva for powering the plane's refrigeration-heating and hydraulic system while on the ground; (3) drive a 24-volt DC generator, recharging the turbine's 24-volt starting battery.

Last month, as AiResearch put its first air line dual-power turbine thru its operational paces, engineers got a preview of packaged efficiency: Single-handedly, a ground crewman hooked the truck-carried compressed air hose and power cable to the Electra's plug-ins. Seconds later he flicked the start-switch on the truck's exterior-mounted control panel. Swathed in fiberglass insulation (2-inches of it enclosing the truck), its exhaust muffled in a silencer, the turbine wound up—to an operational 41,000 rpm. Instantly available was air pressure enough to start the Electra's big prop-jet engines, power aplenty to run its heating-refrigeration hydraulic and communications systems. Said a watching power engineer, "that's what I call packaged power." And it is. For, compared to engines of equal output and versatility, the turbine is a flyweight. Moreover, it is highly mobile—its turbine, alternator, generator, fuel and controls packaged in a truck that can nestle beneath the Electra's wings.

Housed under the truck's hood is the turbine's 24-volt starting battery. Behind the driver's seat are tanked 100-gallons of JP-4 fuel. Screened by a sound-absorbing bulkhead (muffling turbine noise level to 85 db) is an AiResearch silencer (which cuts turbine db's by 40% without significantly increasing back-pressure). The turbine, steel-caster mounted, rides parallel 1-inch channel-steel tracks (thus, the entire turbine assembly, rolled out of the truck, can be put within easy maintenance reach). Exteriorly, the rig mounts: (1) a turbine control panel; (2) a flexible, silicon-rubber, nylon-reinforced air hose (30-ft long, 3½-inches ID); (3) a 30-ft long power cable that plugs into the Electra; (4) a truck-top air inlet for the turbine, another which ducts to an oil-to-air lube oil heat exchanger (on the turbine).

The turbine control panel mounts: (1) a start switch (energizing the battery-powered starter motor); (2) tachometer—showing turbine rpms

as percentage of operational rpms; (3) exhaust temperature indicator (actuated by a temperature-sensing thermocouple in the exhaust pipe); (4) DC voltmeter (indicating output of the DC generator); (5) output bleed-air pressure gauge; (6) and alternator-monitoring indicators, including frequency meter, AC voltmeter and load meter.

In its dual role, the 200-hp GTCP 85-91 (the GTCP meaning "gas-turbine, compressed air, power") consists of three basic components: (1) a two-stage centrifugal compressor; (2) power turbine, including pneumatic control units, and plenum, torus and combustor chambers; (3) accessory section—its integral drive pads and output shaft driving a 24-volt DC generator (for charging the turbine-start battery) and a GE 400 cycle AC alternator (60 kva, 3-phase).

Jet-engine-start bleed air (116 lbs/min. at 50 psia, maximum temperature 450°F) is delivered from a connection located between the compressor discharge and the combustion chamber. In usual ground-start operations, only one prop-jet or pure-jet engine is started. This engine, in turn, supplies starting air to the plane's remaining engines through cross bleed ducts. Thus, the Electra's own batteries won't be taxed.

The ground-unit also relieves the Electra's internal power plant—when the ship is on the ground. While both ground-start and ground-power is an old story, a new chapter had to be written with the advent of jet engines. For not only are jet-system power requirements high, but even more prodigious is their turbines' appetite for compressed starting air. The GTCP 85-91 delivers both . . . from the same turbine package. However, if demand for bleed air exceeds the compressor's capability, a thermostat in the turbine tailpipe (a) reduces air pressure to the load control valve which, in turn (b) closes partially, reducing bleed air flow and maintaining turbine exhaust temperatures within preset limits. The GTCP 85-91's two-stage centrifugal compressor is designed around impellers with backward-curved blades (a double-sided, shrouded impeller for initial compression and an open single impeller for the second stage, both mounted on a common shaft). After first-stage compression, air flows thru a vaned diffuser into seven crossover ducts leading into the inlet of the second stage. Following second-stage compression, air discharges into a vaned collector which vents into the power turbine plenum.

The power turbine's plenum serves both as a receiver of the compressor discharge air, and as an

Prototype turbine rig under wing of Eastern Lockheed Electra.





Preflight checkout, refrigeration and heating as well as starting the Lockheed Electra are all provided by the AiResearch gas turbine shown mounted on an experimental vehicle.

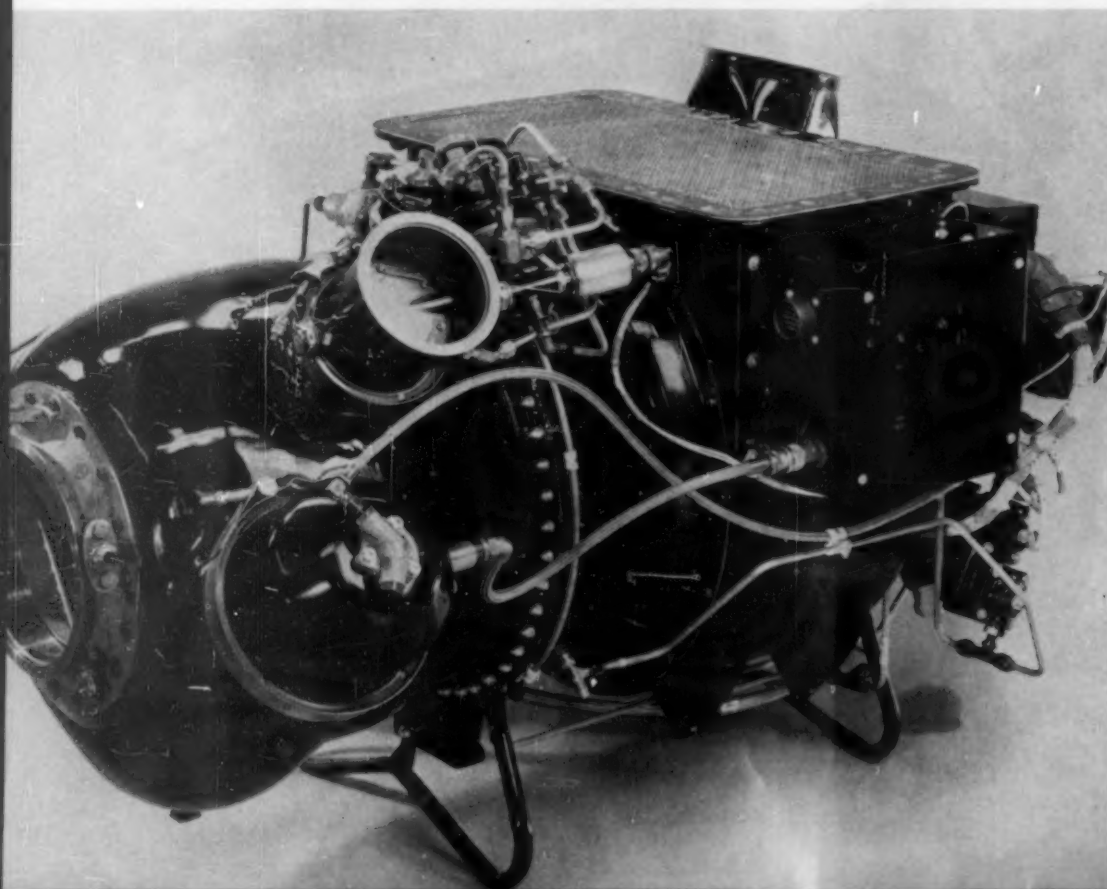
enclosure for the combustion tube and the torus. The torus, mating with the discharge end of the combustor chamber flame tube, directs hot combustion gases thru a fixed-area nozzle ring against the turbine wheel, which is mounted in a bearing carrier (the two ball bearings being pressure-lubricated).

Maximum power extraction is automatically limited by the load control thermostat, prevent-

ing bleed air levels which would result in excessive turbine inlet temperatures (when exhaust gas temperatures exceed about 1100°F, thermostat reduces fuel flow until temperatures return to operating limits). Other safety features failure-proof the turbine:

ELECTRICAL SYSTEM—failure of the unit's electrical system closes the fuel shutoff valve, and the unit is shut down. In addition, the starting

AiResearch model GTCP 85-91 gas turbine weighs 249 pounds and puts out 200 shaft horsepower. Its overall length is only 38 inches.

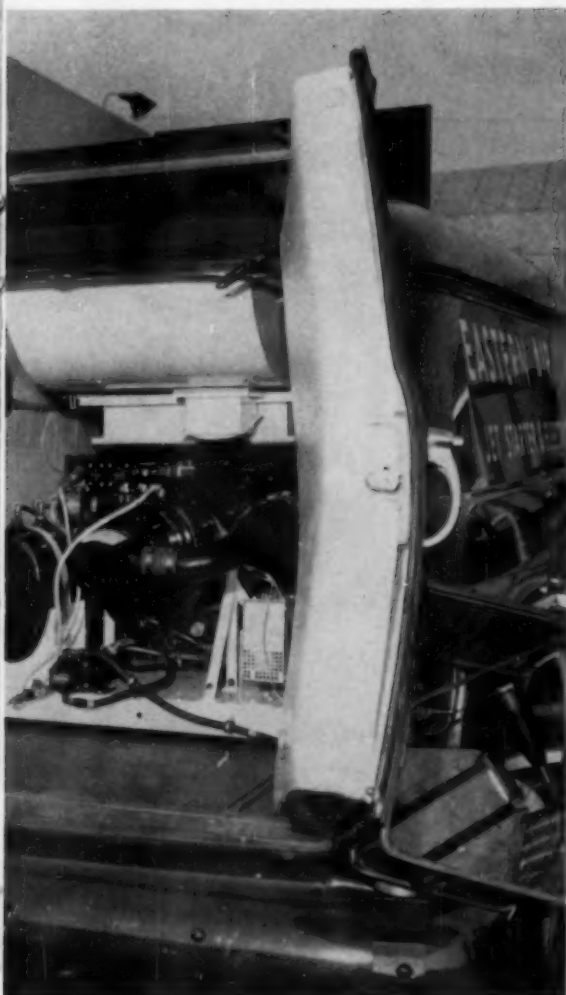


sequence cannot be initiated unless the load switch is in the no-load position.

OVERSPEED SWITCH—mechanically driven, fly-weight actuated, the speed-sensitive centrifugal switch in the unit electrical system breaks the normally closed fuel shutoff valve circuit, and stops fuel flow when governed speed is exceeded by approximately 5 percent.

OIL PRESSURE SWITCH—the oil pressure switch prevents ignition until the oil system has been primed and pressure has developed. This precludes the unit's accelerating to high operating speeds with insufficient lubrication.

Start-up is equally foolproof: up to about 12% of nominal speed, the turbine is accelerated by the starter motor only. From 12% to 35% of nominal speed, acceleration continues under the combined drive of starter and combustion (after an oil pressure switch has opened the fuel solenoid valve). At 35% nominal speed, the starter motor clutch automatically disengages (it's actuated by a centrifugal switch), and the turbine accelerates to governed speed. During starting acceleration, fuel flow is controlled by the over-temperature thermostat, the fuel accessory assembly and fuel atomizer. A pneumatic control increases fuel pressure in relation to increased compressor discharge pressure by reducing the by-pass of fuel. Fuel-flow is controlled, during start-up, by the acceleration limiter. Using compressor discharge air as the



Compact . . . is this prototype of 43 ground-start mobile turbine rigs being built for Eastern Air Lines. At right is electrical outlet. Atop rig are air ducts. Visible is turbine, lube oil tank, and bleed-air outlet for pneumatic starting of Electra. Note how turbine is mounted on tracks for easy maintenance.

AiResearch's GTCP 85-91 performance graph.

reference pressure, high pressure fuel is by-passed to the fuel pump inlet, maintaining allowable maximum turbine discharge temperatures during acceleration. Fuel boost-pump pressure is regulated to 15 psig.

A fan, for unit oil cooling, is mounted separately on the turbine's accessory section. The oil-to-air cooler is a single-pass system. Oil is supplied from a 2-gallon tank, its capacity enough for 50 hours of continuous operation at rated output. Accessories—ac and dc generators—are driven from a multipurpose gear pad and lightweight belt-drive combine. One advantage: frequency control is held essentially constant. Over the full range from no load to full load (on the output shaft), generator frequency is controlled within 1/4 percent. General Electric supplied the alternator, John S. Barnes Corp. the fuel booster pump, Kittell the silencer, Woodward the overspeed governor, and GMC the panel truck.

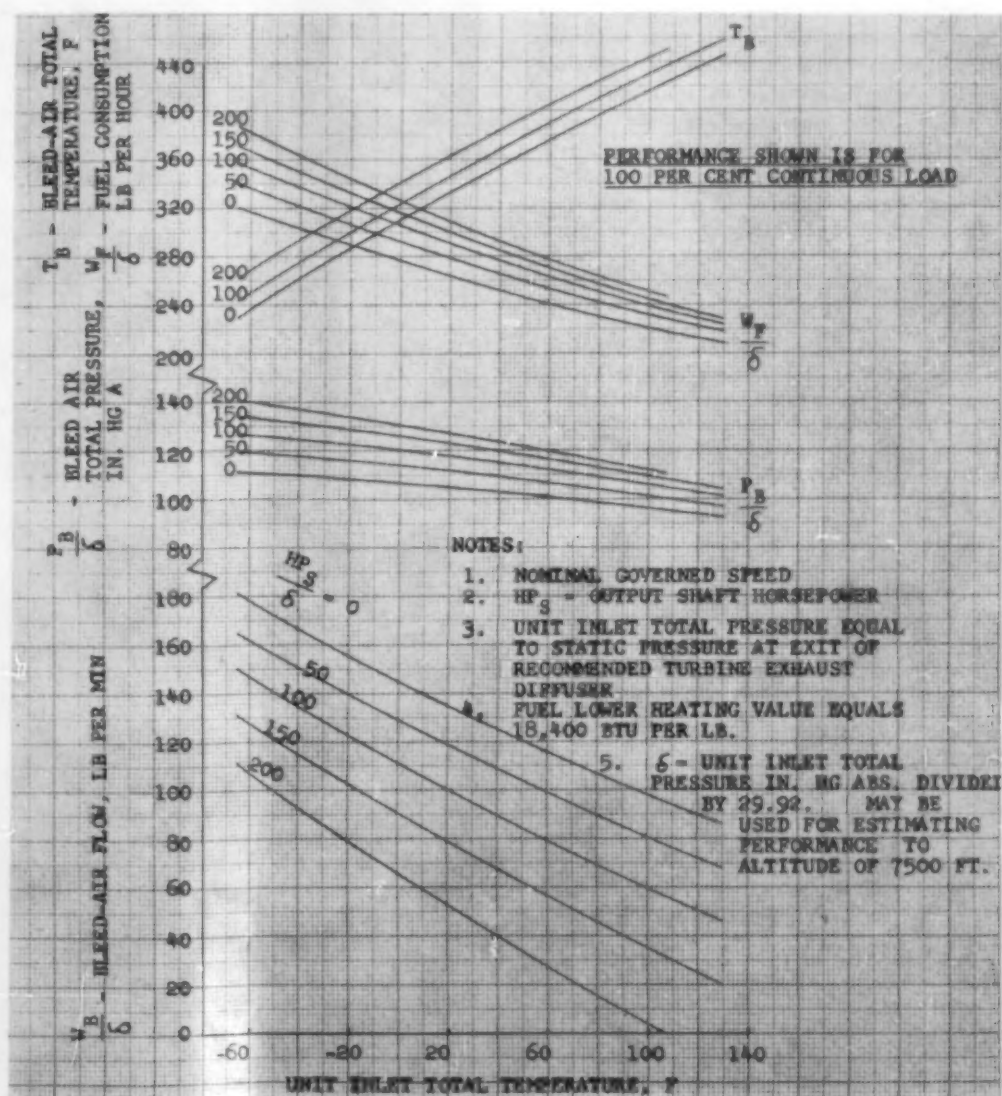
A military version of AiResearch's GTCP 85-91 has



Here, AiResearch turbine is housed in starter cart, and used to start Boeing B-52's engines.

seen world-wide service with the Armed Forces (both aloft and on the ground). It has operated successfully at ambient temperatures from -65°F to $+130^{\circ}\text{F}$, and its service life (minimum) is rated at 1000 hours or 3000 starts (each jet-engine start-up is considered a "start"). These, however, are the first ground-start turbines to power com-

mercial jets . . . and the first to be panel-truck packaged. Australia's Qantas Air Lines has ordered 21 of the units for its Electra and Boeing 707 (pure-jet) fleet, tho Qantas' ground gear will be cart-mounted, the turbine delivering only starting air (as a bleed air producer only, the turbine is designated GTC-85-90).



LIFE SAVING POWER

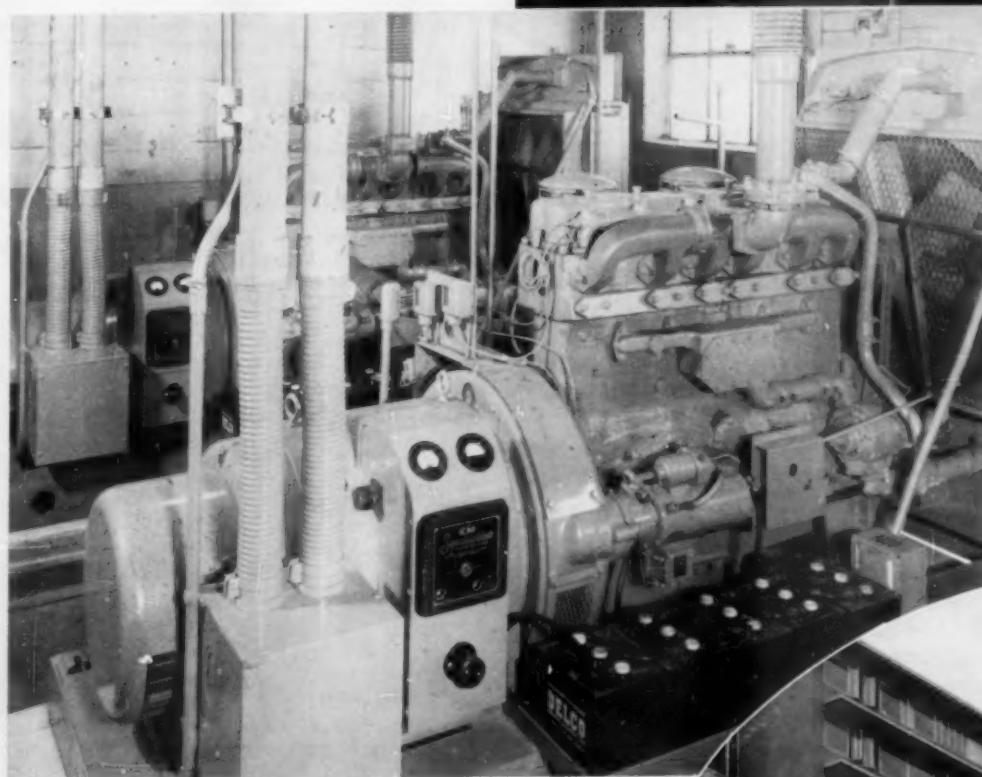
By DOUGLAS SHEARING

JUST a few years ago the installation of a diesel engine generator set in a major hospital was the rare exception and the economics behind a capital investment of this type was sharply questioned by the governing boards of many of these public institutions. Today, the economics of such a decision are in the background, and consideration of the human element is the deciding factor. Predicated on this basis, a growing trend has now become an established pattern and modern hospitals find it imperative to provide patients with standby power protection and diesel generator sets have been the logical choice to provide this life saving power. Cognizant of just how essential emergency power is to hospitals, national and local Civil Defense Agencies are firmly encouraging hospitals, not now equipped with standby generator sets, to add them to their facilities and are urging their incorporation into all new construction. To further this program, Civil Defense has funds that can be made available for the procurement of this equipment. Additional evidence of the desirability of this protection is the fact that the multi-million dollar Hill-Burton fund established by Congress for the construction and modernization of hospitals, states that emergency standby power is one of the requirement standards.

Many diesel engine manufacturers are concentrating a great deal of effort in producing special power packages for this market. Allis-Chalmers Engine Division, for example, has done a lot of engineering and application work in this area. Producing all the generator set components within its industrial framework, Allis-Chalmers builds a range of packaged diesel engine generator sets for this service from 25 to 300 kw continuous. Built for either manual or automatic operation, each unit is equipped with all safety devices necessary for instantaneous, reliable power. In a new brochure, the company calls attention to the critical need by hospitals for electric power. Without lights, surgeons can not operate and nurses can not minister to patients. Without electric motors, elevators could strand patients between floors, and food handling and other between floor services would be extremely difficult. Without electric power, boilers could explode from lack of water or shut down from lack of fuel. Heat could not be circulated without electric fans and pumps. Refrigeration equipment in blood banks, laboratories and kitchens would be inactive without compressors driven by electricity.

An engine generator set can provide full power coverage and allow all hospital functions to continue during normal source outages. This full coverage requires a set large enough to supply each patient with about one kw per bed. The larger generator set cost is generally compensated both by the convenience of full power and by the

much more simplified wiring installation. On strictly an emergency basis, a diesel generator set can be supplied to protect only the most vital hospital services, lights and a few motors. This, of course, provides no reserve for future expansion or especially serious emergencies. The initial cost, however, is lower, about $1\frac{1}{2}$ kw per bed, but



special circuits are generally needed and are costly. The chart illustrated was prepared by Allis-Chalmers and provides an easy way of determining standby capacity. Ratings are based on sets designed especially for the demands of hospitals, and generator set installation dimensions are based on radiator cooled units with control equipment included in the package.

Diesel engine generator sets, as mentioned previously, can be supplied for either manual or automatic starting. With the latter, an automatic transfer switch is employed and is connected at all times so that the hospital power flows through it. If power fails, the switch automatically starts the sequence that starts the engine and switches the load. When normal power is restored, the transfer switch shuts down the generator set and returns the load to normal. To be totally automatic and eliminate the necessity of an operator,



HOW TO SELECT THE PROPER SIZE STANDBY GENERATOR SET FOR YOUR HOSPITAL

| HOSPITAL NO. OF BEDS | FULL PROTECTION | | EMERGENCY PROTECTION | |
|-------------------------|---------------------------------|----------------------------------------|--------------------------------------------------------|----------------------------------------|
| | OF ALL ELECTRICAL FACILITIES | APPROXIMATE FLOOR SPACE REQUIRED | OF ONLY VITAL ELECTRICAL EQUIPMENT ON LIMITED BASIS | APPROXIMATE FLOOR SPACE REQUIRED |
| 20 Beds | 20 Kilowatts | 10' x 6' | 10 Kilowatts | 8' x 5' |
| 30 Beds | 35 Kilowatts | 9' x 5' | 15 Kilowatts | 8' x 5' |
| 40 Beds | 45 Kilowatts | 10' x 6' | 20 Kilowatts | 10' x 6' |
| 60 Beds | 65 Kilowatts | 11' x 6' | 35 Kilowatts | 9' x 5' |
| 70 Beds | 75 Kilowatts | 11' x 6' | 40 Kilowatts | 10' x 6' |
| 90 Beds | 100 Kilowatts | 13' x 7' | 60 Kilowatts | 11' x 6' |
| 100 Beds | 110 Kilowatts | 13' x 7' | 75 Kilowatts | 11' x 6' |
| 150 Beds | 150 Kilowatts | 13' x 7' | 100 Kilowatts | 13' x 7' |
| 170 Beds | 175 Kilowatts | 13' x 7' | 120 Kilowatts | 13' x 7' |
| 200 Beds | 200 Kilowatts | 15' x 8' | 150 Kilowatts | 13' x 7' |
| 250 Beds | 250 Kilowatts | 16' x 8' | 175 Kilowatts | 13' x 7' |
| 300 Beds | 300 Kilowatts | 16' x 8' | 200 Kilowatts | 15' x 8' |
| 350 Beds | 2-170 Kilowatts* | 13' x 16' | 220 Kilowatts | 15' x 8' |
| 400 Beds | 2-200 Kilowatts* | 15' x 16' | 250 Kilowatts | 16' x 8' |
| 500 Beds | 2-250 Kilowatts* | 16' x 16' | 275 Kilowatts | 16' x 8' |
| 600 Beds | 2-300 Kilowatts* | 16' x 16' | 300 Kilowatts | 16' x 8' |

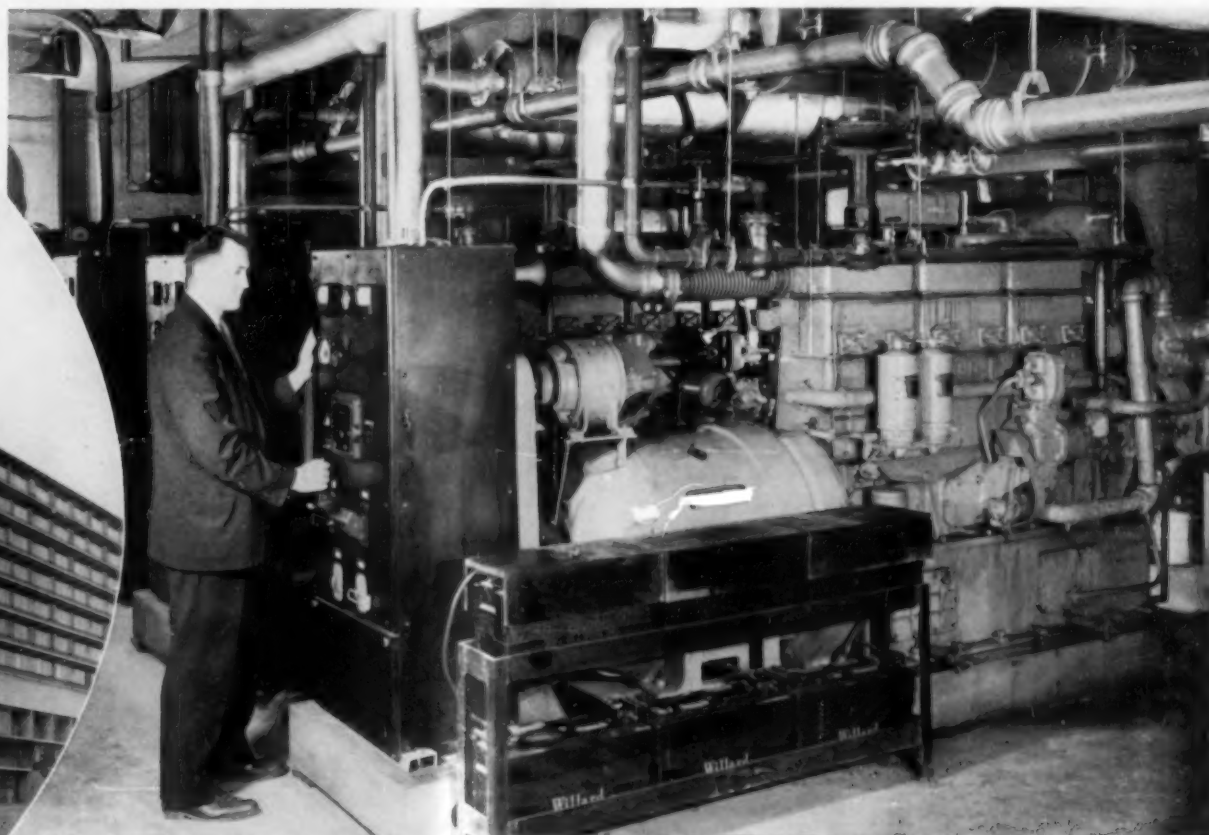
* Indicates two units in parallel operation.

Above—716 bed City of Memphis Hospital is typical of many public institutions that have installed diesel engine generator sets for standby power. Shown to the left are the two Allis-Chalmers 100 kw model 6DAG-970 sets that serve this modern hospital.

Bottom right—Battery of Allis-Chalmers engineered, self contained model 6DCSG-1879 supercharged diesel generator sets, each rated 125 kw. They are installed in the lower level of the Columbus, Ohio Receiving Hospital, shown below.

an automatic starting panel is also required. Switchboards for this type of installation are generally supplied for four types of mounting: directly on generator; on floor stand; on wall and with base cubicle for floor mounting. The most economical mounting is generally achieved by mounting the switchboard on the generator set. Normally this allows the unit to be package wired at the factory and few installation expenses are incurred. Electric starting is most convenient be-

cause it is easily maintained and lends itself well to automatic devices. If the hospital already has a source of compressed air of the proper pressure, air starting can also be used. When quick starting is not a prime requisite, a gasoline starting engine can be mounted on the generator set proper. Sets are furnished for installation directly on a concrete foundation or can be supplied already mounted on a steel sub-base with vibration dampers if necessary.



10 TO 150 KW BRUSHLESS GENERATORS

Electric Machinery Brushless Line Marks Another Step in Industry Development Trend to Important New Generator Design.

A new line of brushless generators with ratings from 10 up to 150 kw has been announced by Electric Machinery Mfg. Co., Minneapolis, Minnesota. This new line is another step in the fast moving development of the brushless type diesel driven generator to provide electric power. The brushless generator offers many advantages including safety features by eliminating sparking, and high operating reliability and low maintenance by eliminating brushes, slip rings and commutators, which are subject to wear and damage from dust and dirt. Early applications of brushless generators have been in the oilfields and mostly

in offshore drilling installations where safety is a primary factor. Another recent application has been in mechanical refrigeration cars built for railroads where reliability is very important. Crushing plants and construction jobs where dust and dirt are a problem have also seen some applications and offer an ideal spot for this generator. The general development of brushless generators by generator manufacturers looks so promising that these units are expected to take a strong position in the generator market quickly and should eventually become the most important type used in high speed diesel generator sets.

With these new brushless generators, Electric Machinery broadens its line to give a wide selection of brushless and the packaged brush type line, which includes the Amp-Pak and the Reg-Amp models.

Generator Design Features

A brushless generator is a generator which has neither a commutator nor slip rings and likewise no commutator or slip ring brushes. Like many technical achievements, the theory preceded the hardware by many years. The necessary hardware, in this case, was the development of the high power

silicon diode. With the silicon diode, an a-c to d-c (rectification) conversion can be made with a very small device that can be incorporated in the rotor of the generator. This is also a very tough and efficient device, and very importantly, the silicon diode has become attractive in price, competing directly with d-c exciters. These silicon diodes, or silicon rectifiers as they are commonly called, have some important advantages. They are up to 99% efficient in achieving rectification. Their size is very small. The accompanying illustration showing a silicon rectifier, a pin and a pencil bring this out very well. Silicon rectifiers also do not lose efficiency with age and operate indefinitely at high temperatures, thereby offering high reliability.

To show how a brushless generator works, it is helpful to compare it with a conventional generator. A conventional generator uses a rotating exciter furnishing d-c to the generator field through

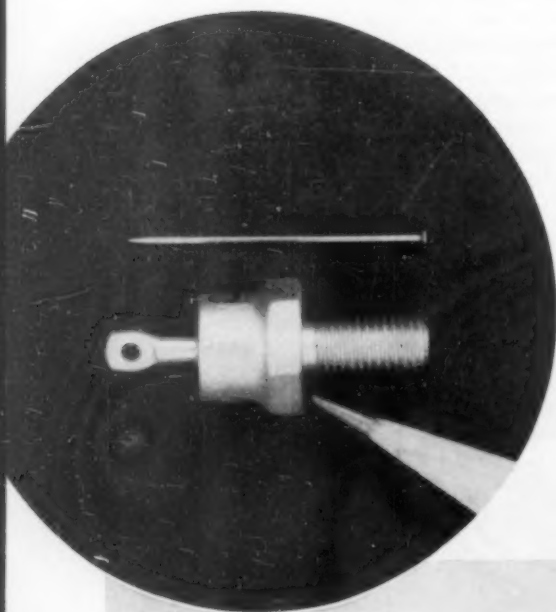
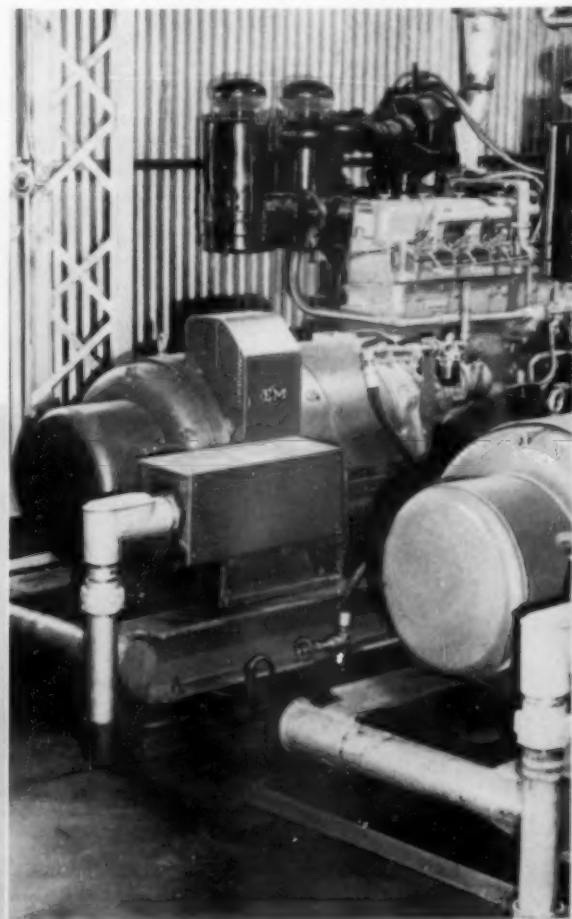
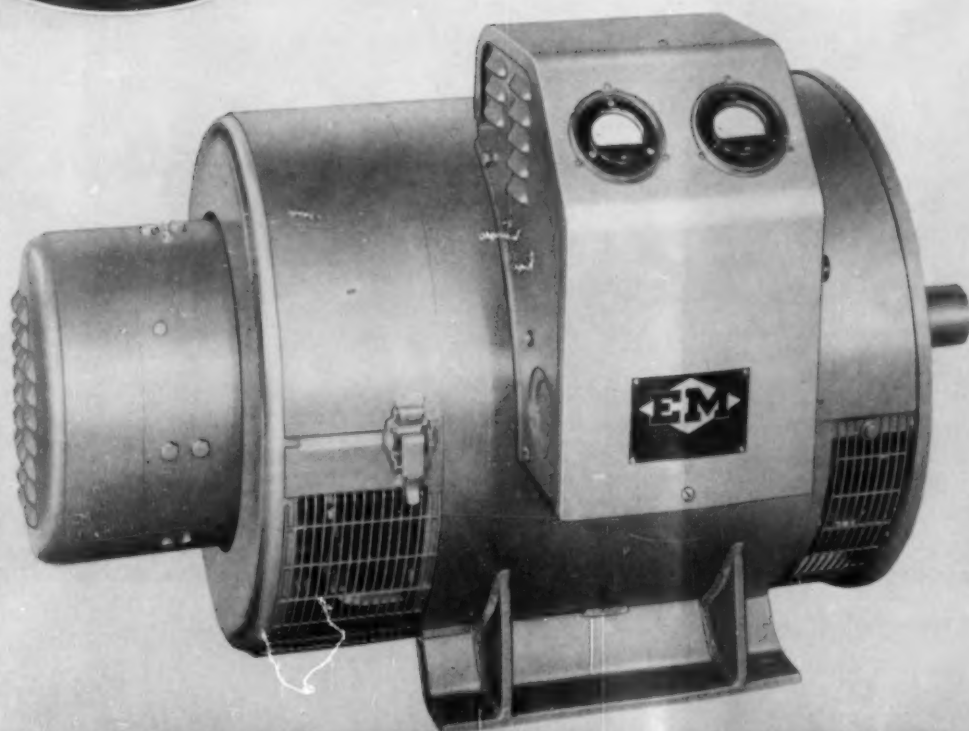


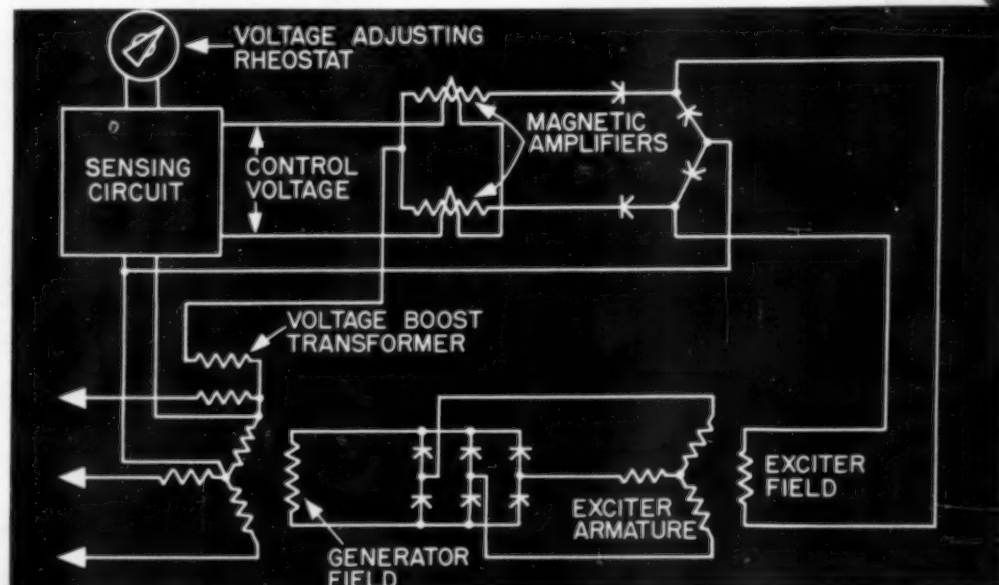
Illustration of an individual silicon diode or silicon rectifier unit to illustrate its small size as compared to a pin and a pencil.



Packaged Electric Machinery brushless generator. This unit includes meters and voltage regulator.

two sets of brushes. One set is on the exciter commutator, the other set is on the generator rotor slip rings. A conventional exciter is basically an a-c generator, the output of which is rectified through a commutator. Fundamentally, brushless generators replace the commutator with another type of rectifier, the silicon diode or silicon rectifier. Usually six rectifiers will be used to make up the rectifier assembly in a brushless generator. The assembly is mounted on a circular plate at

Close up view of rotating silicon diode rectifier assembly. There are six diodes in this assembly.



Brushless Generator schematic diagram showing general arrangement of silicon rectifiers and magnetic amplifier voltage regulator.

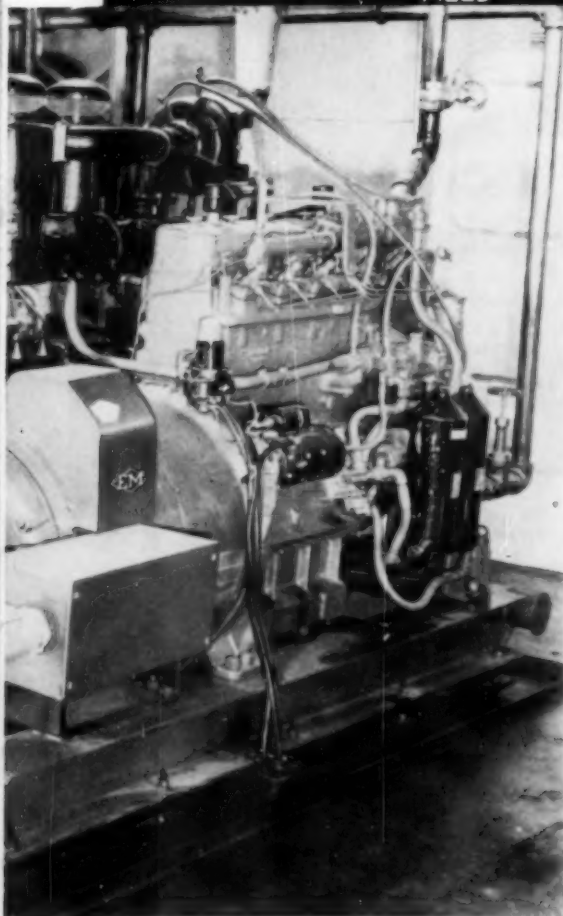
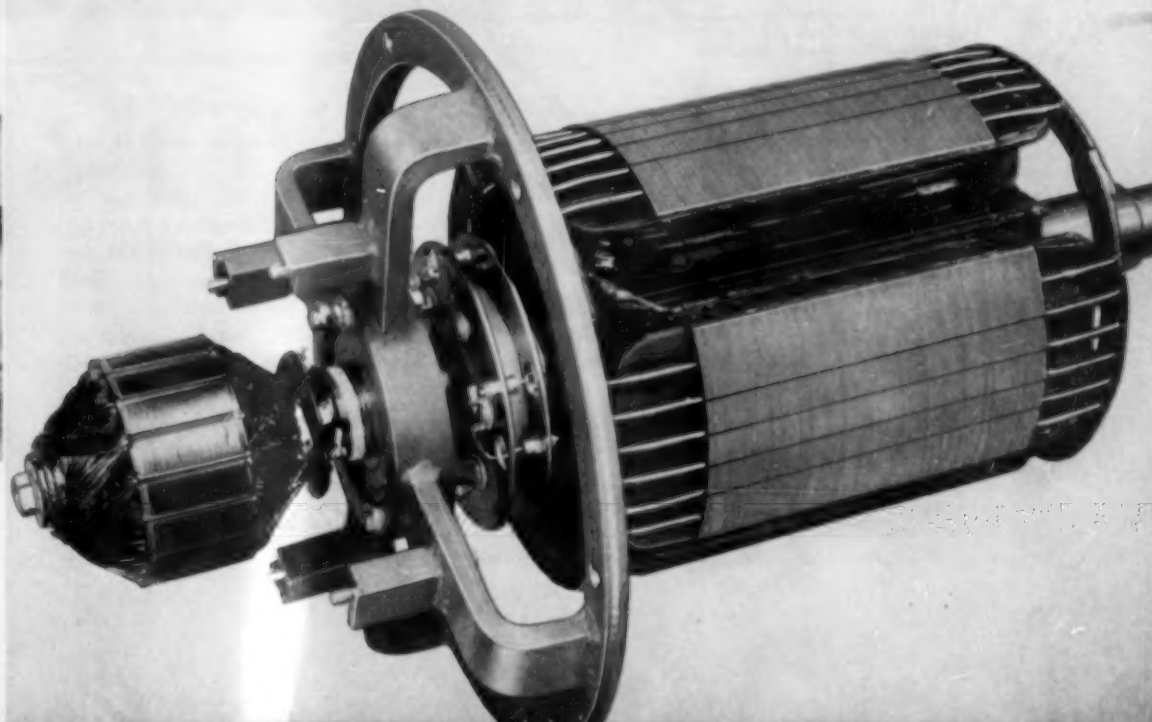
tached to the generator shaft. The rectifier assembly rotates with the rotor.

The exciter for the brushless generator is a three phase exciter, which gives high efficiency and output. This a-c exciter receives its field or magnetism in two ways. In part, the build up is caused by

the residual magnetism of the exciter. Primarily, however, the build up stems from a simple rectifier circuit, which takes part of the generator output, rectifies it, and furnishes a field for the exciter. Typical ratings of the silicon rectifier as used on an Electric Machinery brushless generator is 200 volt-12 amperes.

The brushless line is offered in packaged units complete with voltage regulator and meters. A magnetic amplifier type voltage regulator is used, similar in many ways to the Amp-Pak regulator used in other Elgctric Machinery generators. The R14, R17, S20 and S23 frames make up the line with one basic voltage regulator, which can be used interchangeably in any of the generators with only minor changes. The length of the brushless generator will be less than standard brush types. The brushless generators are offered in ratings from 10 to 150 kw at speeds of 1800 rpm and 1200 rpm, 4 pole and 6 pole. Single and two bearing generators will also be offered and voltages are standard low voltages only in a broad range of voltage winding (208/416-240/480 volts). This brushless generator line features standard parts that will fit a wide variety of diesels built in the United States.

Brushless generator rotor. A-c exciter armature is at the left and the rotating rectifier assembly is clearly visible in the center.



Brushless generators will find a natural market for use on offshore drilling rigs because of their spark-free features.

NEW DUAL DRY TYPE AIR CLEANER

**Donaclone Cleaner Available in Four Different Types;
System Combines Centrifugal Cleaning Stage
And Paper Filter.**

FOLLOWING 16 years of research, development and testing, Donaldson Co., Inc. of St. Paul has begun volume production of its Donaclone Duo-Dry air cleaner. According to the manufacturer, the cleaner attains a high level of performance, with dust removal nearly 100 per cent to provide long engine life. A heavy-duty unit, its principal fields of application are in construction, strip mining and aggregate production, farming and over-the-highway trucking. It has been tested in all of these applications with an accumulated total of over 150,000 operating hours.

The new Donaclone filter employs a dual dry system, combining a centrifugal cleaning stage of high efficiency with a specially engineered paper filter, in that order. Heart of the filter is the abrasion resistant nylon tube. As shown in Figure 1, the vanes at the top impart cyclonic twist to the air which throws dust particles to the outside.

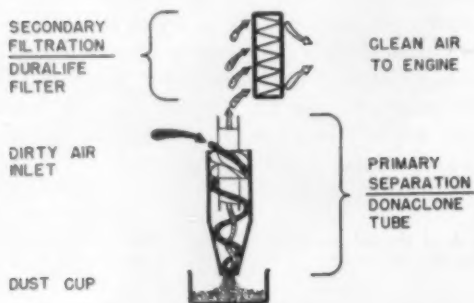
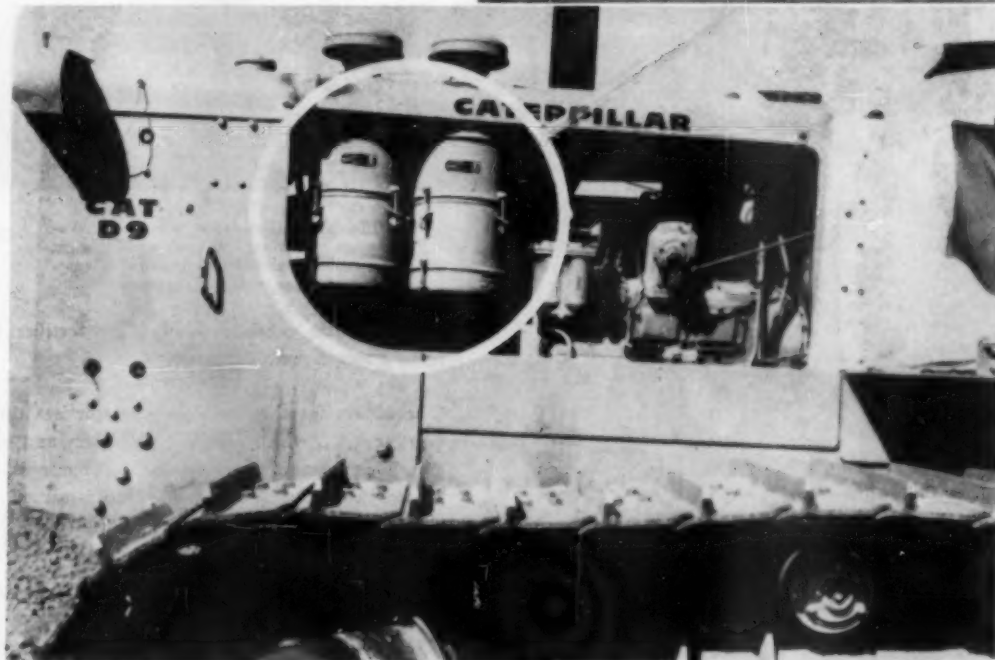


Figure 1., Donaclone air cleaner simplified functional diagram.

Clean air at the center passes up through the aluminum tube to the filter element while the dirt is caught and retained in the removable dust cup. To take advantage of the tube efficiency, the secondary or paper filter element provides high dust-holding capacity. Termed the Duralife element by Donaldson, this paper filter is designed to function satisfactorily when it encounters oil vapors, exhaust carbon, line, chaff and moisture. Long service life of the new filter is combined with a high and level efficiency over the entire air flow range as shown in Donaldson laboratory performance curves in Figure 2. This is important from the standpoint of engine protection because varying air flow and reduction of engine speed settings occur in normal field use. A

typical Donaclone applied to an engine with an air demand of 750 cfm at idle has an efficiency of 99.9 per cent throughout this air flow range. Because of this feature, an increase or decrease of governed engine speed by the user will not result in loss of engine protection.

Since a filter of this type can be considered for

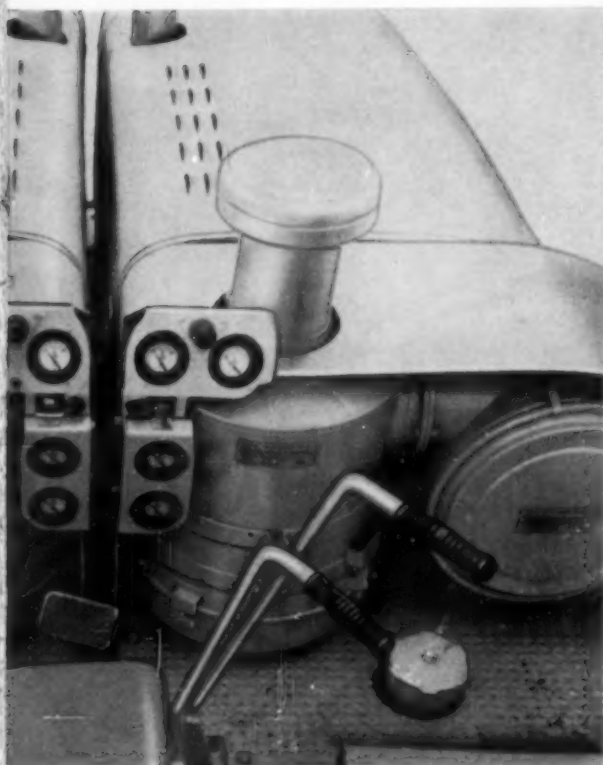


SD-A dual cleaner installation on Caterpillar D9 crawler tractor. Filter element is serviced from the bottom.

general application only after field trials, Donaldson engineers applied the unit to a wide range of vehicles, engines and operating conditions. Actual field tests aggregating more than 150,000 hrs. have been completed on the new filter. The first stages of field tests were conducted under closely controlled conditions at the Phoenix, Ariz., Proving Grounds of Caterpillar Tractor Co. Later this work was expanded to the Peoria Proving Grounds of Caterpillar Tractor Co.; the General Motors Proving Ground at Milford, Mich.; the International Harvester Co. Proving Grounds at Phoenix and the Army Ordnance Testing Grounds. Over 150 Donaclone air cleaners were also installed on commercial equipment and on vehicles operated by the military forces. These installations pro-

vided field experience from Florida to California—from Alaska to Arizona. Test vehicles were farm tractors, over-highway trucks, off-highway construction equipment, rock-crushers and military tanks. Over 10,000 operating hrs. have been accumulated on individual test Donaclone air cleaners. Visual inspection in these field tests supports the efficiency standards shown by laboratory tests. The air transfer pipes following the Donaclone air cleaners were found to be clean and dry. A reduction in upper engine wear is indicated. The magnitude of this decrease, however, will not be recorded until a complete pattern of engine wear is established and evaluated.

The new Donaldson filter has been engineered



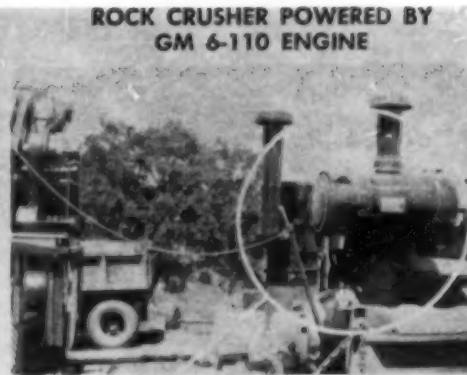
Euclid TC 12 powered by twin GM 6-71 engines. Two Donaldson dry-type air cleaners replace four oil-bath units. Tube section and filter section are separated and connected by ductwork.

and designed for application to all sizes and types of engines. Installations have already been made on engines from 35 to 800 hp—carbureted and diesel; naturally aspirated, supercharged and turbocharged. This design flexibility is evidenced by the four different types used in the test program. One design has the center tube inlet and side outlet typical of many oil bath air cleaners. Another design separates the tube section and filter section into individual units, connected by ductwork. The third has a side inlet which can be shrouded or tubular and the filter element is serviced from the top. The fourth Donaclone design is rectangular in cross section in contrast to the cylindrical cross sections of the other three. This rectangular cleaner can be of any practical dimensions as long as the proper area is maintained. The outlet is usually at one end with the inlet located on any of four sides. Filter element access is through a specially designed door. A filter of this general design was developed by Donaldson to meet special military requirements of an M-48 tank. One of the unique design elements of this particular filter was its electric, automatic dust exhauster. This new filter is being produced in Donaldson's St. Paul plant with the filter cartridge being manufactured in the company's new plant in Chillicothe, Missouri.

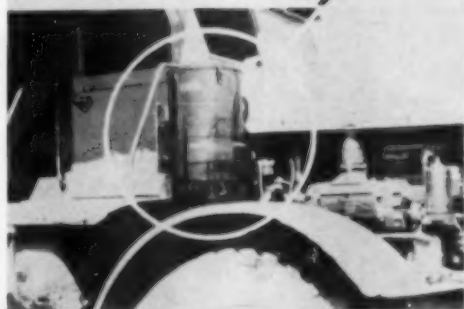
Figure 2., Laboratory performance curves of typical Donaclone air cleaner.



IHC DUMP TRUCK WITH CUMMINS NH6B ENGINE



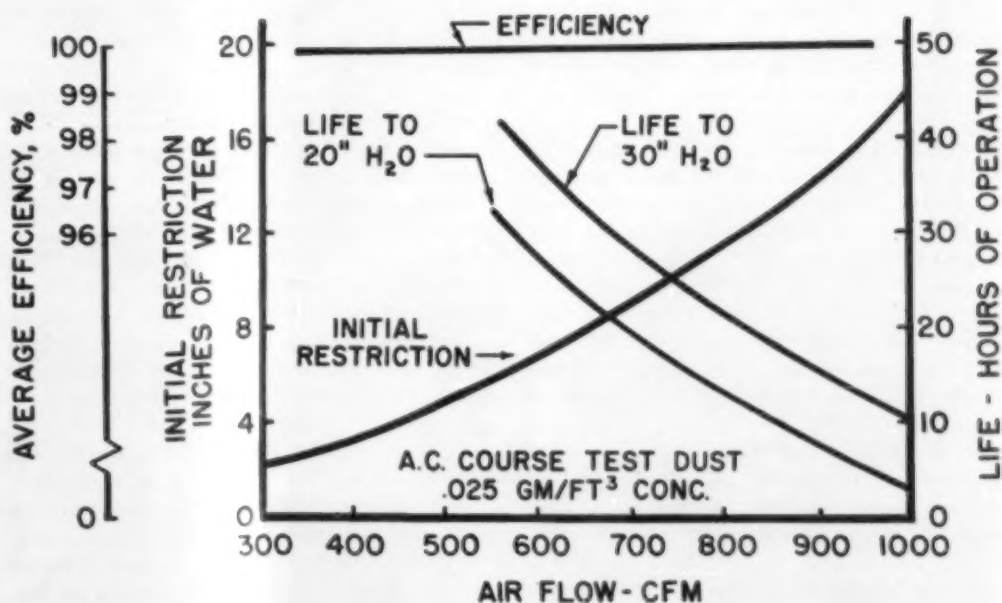
ROCK CRUSHER POWERED BY GM 6-110 ENGINE

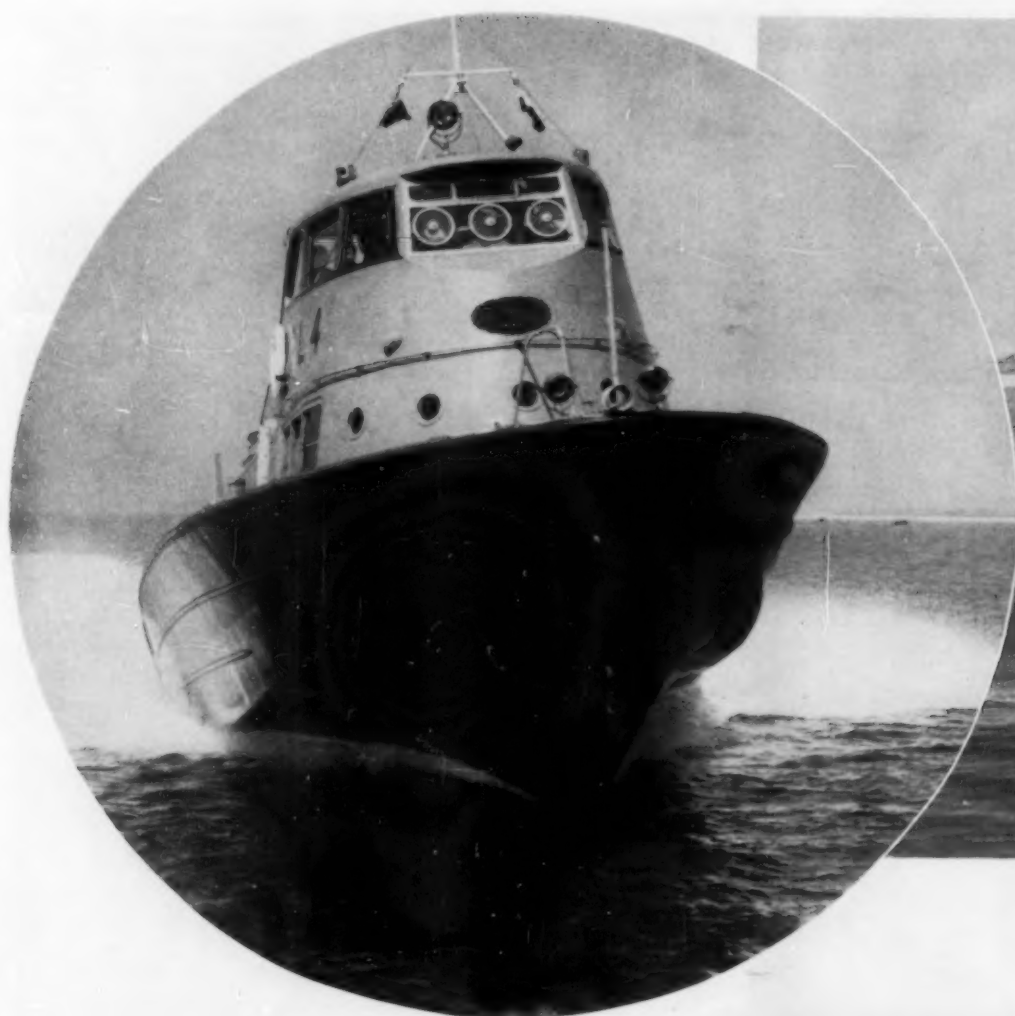


OFF HIGHWAY ORE TRUCK WITH TWIN GM 6-71 ENGINES



TS18 EUCLID SCRAPER WITH GM 6-71 ENGINE





EXPRESS PASSENGER LAUNCH FOR SHELL

By DOUGLAS SHEARING

VOSPER Limited, Portsmouth, England, have recently completed a most interesting fast passenger launch for Compania Shell de Venezuela for use on Lake Maracaibo, Venezuela. The "staff" requirements laid down by Shell were more stringent than hitherto for this type of craft in view of new oil concessions further out into the Lake—distances of up to 75 miles being involved. It was laid down that up to 60 passengers were to be carried at a speed of 35 knots.

This craft was ordered for C.S.V. Limited by Shell Tankers Limited and the design prepared by Vosper Limited in close collaboration with representatives of these companies. In the early stages a joint meeting was held at Maracaibo when requirements were agreed and the designers were able to obtain very useful information on the conditions under which these craft operate. A craft 80'0" in length was decided on, powered with two Napier Deltic 18 cylinder two stroke diesel engines type 18-25K each giving 1620 bhp at 1500 rpm. It was stipulated that the steering position should be well forward and high to give coxswains the best possible vision—an essential on the Lake due to floating logs and debris.

The hull is of the hard chine form of all welded

steel but in view of the necessity to have the conning and passenger positions forward Vosper Limited have put much detailed thought into the hull form to avoid that characteristic so often associated with hard chine craft—slamming in a seaway. Subsequent trials have demonstrated the success achieved in providing comfortable riding conditions. The conning position was "mocked up" before details were finalized, resulting in a very satisfactory arrangement, the crew being provided with adjustable seats, instrumentation and combined throttle and reverse levers being conveniently arranged. The steering gear as designed and manufactured by Mathway is electro-hydraulically power-assisted for normal operation, but alternatively can be operated manually in the event of power failure or other untoward incident. The combined throttle and reverse gear controls were supplied and fitted by Teleflex. In both cases the equipment is of a high standard, providing the coxswain with excellent control.

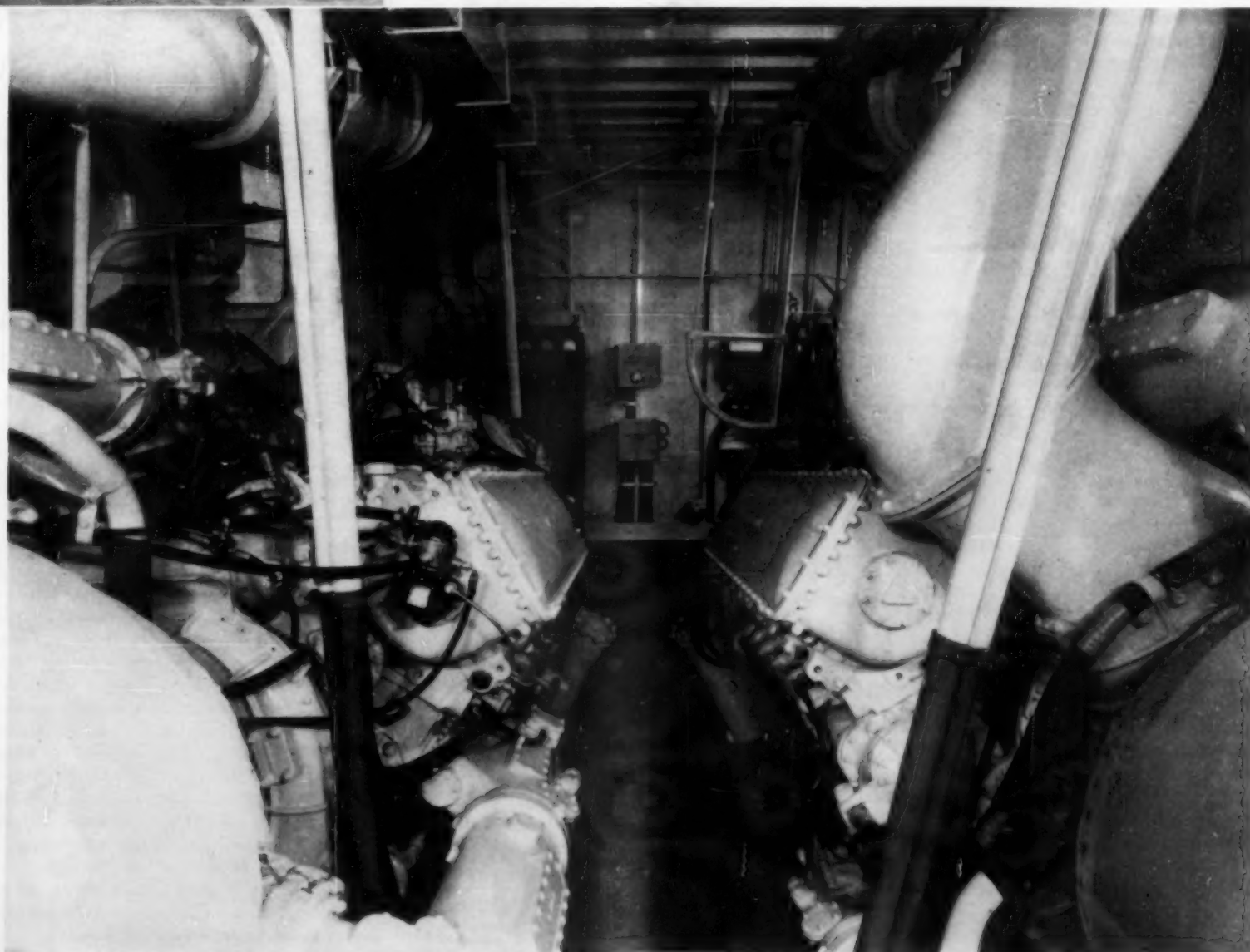
The superstructure is all-welded light alloy and the passenger accommodation pleasantly furnished, being lined with light green Lionide. Ventilation trunking with directional punkah louvres is fitted throughout the space. Electrical power is derived from a 1.5 kw 24 vdc Lister generating set float-

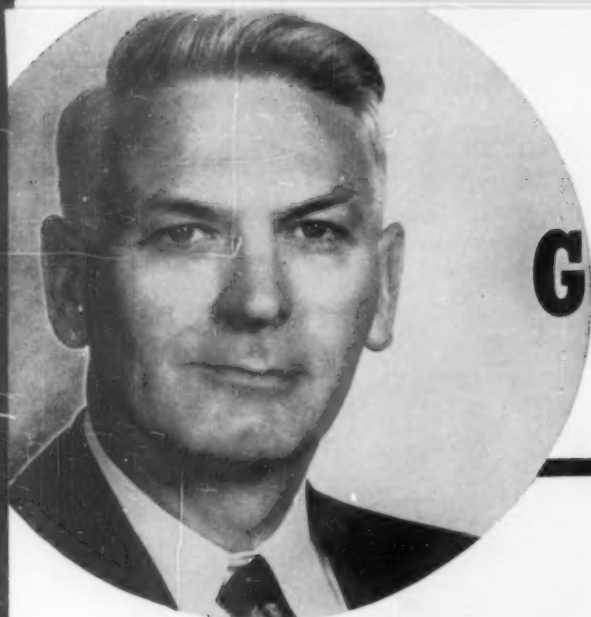
ing a 24v 130 ampere-hour battery by the D. P. Battery Company. Equipment includes searchlights for running at night and a Pye "Ranger" marine type ship-to-shore wireless set by Pye Telecommunications Limited. Very satisfactory results were obtained on official trials—a maximum average speed of 37.35 knots being recorded over the Stokes Bay mile.

The Napier Deltic diesel engine type 18.25K is a development of the motor torpedo boat engine as already used by many navies throughout the World, but de-rated to increase the period between overhauls for commercial uses. As full power can be transmitted in either direction, both port and starboard engines are identical, thus reducing the spares holding at the operational base. The drive from the engine passes into an integral reversing gearbox and thence to a Napier Vee-drive. As there is no reduction gear the final propeller speed is equal to that of the crankshaft; that is, 1500 rpm at full speed. These two engines incorporate a patent Napier device whereby astern can be selected from full speed ahead, enabling the launch to come to rest in approximately two boat lengths. They also incorporate fully automatic starting and protection equipment giving complete control from the wheelhouse.



Below is the engine room of the 80 ft express passenger launch designed by Vosper Limited of Portsmouth, England, for Compania Shell de Venezuela. It is powered with a pair of Napier Deltic diesel engines rated at 1620 bhp at 1500 rpm. Above, three views of this very fast seaworthy crew boat.





GAS TURBINE PROGRESS

A COMMENTARY BY R. TOM SAWYER

R. Tom Sawyer's well known in the gas turbine field having been the first chairman (1944) (and now treasurer) of the Gas Turbine Power Division of ASME. He spent 7 years with G.E. Transportation Dept., and 26 years with American Locomotive, now Alco Products. At present he is a Consultant, including "Consultant to the Staff" of the Experimental Towing Tank at Stevens Institute of Technology. In addition to being a Fellow Member of ASME and AIEE, he is a member of SAE, ARS, ANS, IME in London, DEUA in London. He is also a member of Franklin Institute and a Professional Engineer. Mr. Sawyer is the author of *The Modern Gas Turbine* and *Gas Turbine Construction*, and co-author of *Applied Atomic Power*.

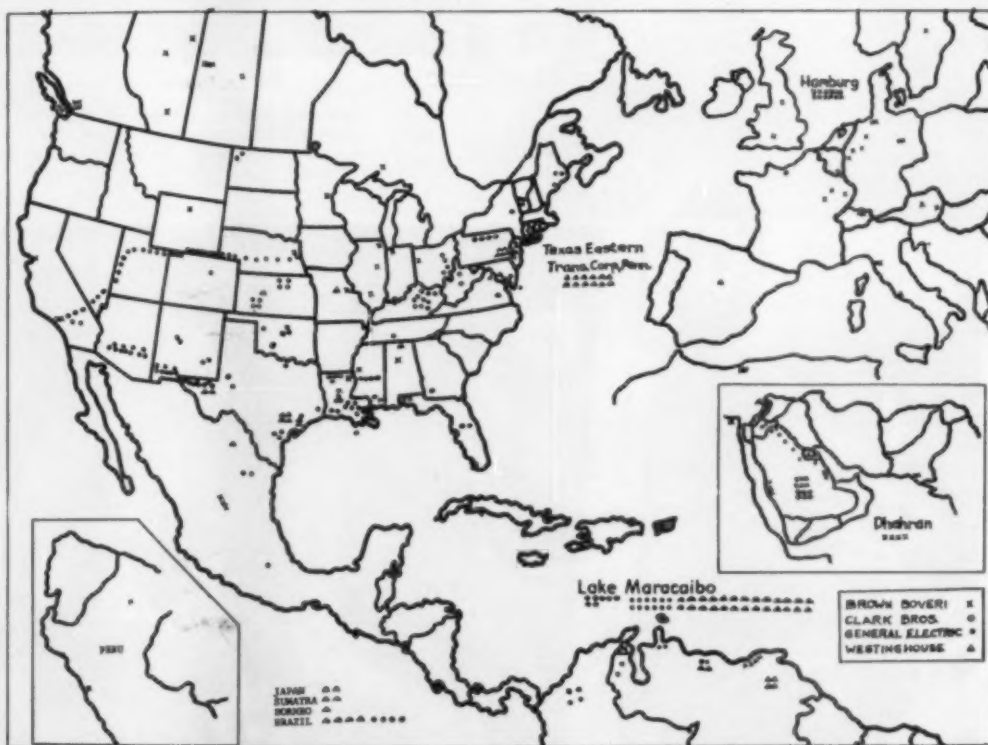
1958 Gas Turbine Progress Report*

RAILROAD—During the past six years the gas turbine locomotive has become a success. Twenty-five 4500 hp units are now operating on the Union Pacific system and additional larger units have been ordered. Some of these new 8500 hp three unit locomotives should be in service at the time this paper is presented. The diesel locomotive of today is extremely versatile and economical, and for this reason it is difficult to produce a unit which can take its place. The gas turbine locomotive can take its place but today these applications are very limited. When the gas turbine automobile has been definitely introduced it is very likely that the gas turbine locomotive will follow as both gas turbine units are entering a highly competitive field.

MARINE—This paper is one of the longest and most monumental in the series as so many types of turbines have actually been placed in service on the water. There has also been an extremely varied number of applications which range from high speed light weight boats to the ocean freighters. The former is a light weight turbine without a heat exchanger and the latter requires a large heat exchanger unit. The many variations are covered in this paper.

INDUSTRIAL AND STATIONARY—Many of these units are shown on the adjoining map. Again we have a large assortment of shapes and sizes of turbines in this class of service. One of the most promising uses of the gas turbine in the future in this field is the supercharging of a steam power plant boiler. The gas turbine lends itself well to being a companion unit to other prime movers. It has done so well in assisting in power output of the diesel it now may help revolutionize and improve the steam turbine plant. Again the gas turbine may be used as a companion unit in the steel and chemical industries as illustrated in the paper. It has been used to a certain extent in the refinery field and may expand there. It is definitely expanding in the pumping of both gas and oil. One of its latest ventures is on an Arabian oil line

*Conclusion of summary of 12 papers to be presented on December 2, 1958 before the Annual Meeting of the ASME.



Map showing location of heavy gas turbine units in service built by the four manufacturers shown. Most units range from 2000 hp to 20,000 kw. A few of the locations are process units in chemical or refinery plants, this includes Brown Boveri units in U.S.

system (Tap Line) where portable pumping plants of 5,000 hp are utilized.

NUCLEAR POWER—Little has been done in this field to date, but there are tremendous possibilities by the use of gas turbines and high temperatures to produce a highly efficient nuclear power plant. General Dynamics has a contract from the Maritime Commission and the AEC to produce such a plant for eventual installation in a nuclear merchant ship. Possibly the only means of producing a nuclear power plant in a locomotive is by using the gas turbine. Even though little has been accomplished in this field in the past six years we can expect some very definite results in the next six years.

CONCLUSION—It would be good if we could add

up the horse power in all the gas turbine units referred to in all of the above, but unfortunately this cannot be done due to the extreme variation in horse power, applications, and individual types of turbines. There was a day not long ago when the gas turbine industry was trying to break through and be recognized. That has come and gone in these past six years. Today the question is "how should we use the gas turbine," rather than, "should we use the gas turbine?" As editor of this 1958 progress report, let me express my deep gratitude to the many people who have materially assisted in its preparation, particularly Captain (Dr.) W. T. Sawyer, Office of Naval Research.

Complete report is available from ASME, 29 W. 39th Street, New York 18, N.Y., at \$5.00 per copy to non members, \$4.00 to ASME members.

NEW INCLINED 87 BHP DIESEL

A NEW underfloor six cylinder diesel engine inclined at a 24 degree angle above horizontal has been introduced by F. Perkins Ltd., the Peterborough, England diesel engine manufacturer. Known as the C. 305, this extremely compact power unit is being fitted in the new forward control Commer four-ton truck, and it is also being offered as optional first equipment in the new five and six-ton forward control Commers and the new Karrier Gamecock models. The engine develops 87 bhp at 2400 rpm, the maximum governed speed. Maximum gross torque is 216 lbs. ft. at 1300 rpm. It has a 3.6 in. bore, a 5 in. stroke and 305.3 cu. in. displacement. In its inclined position, the C. 305 engine has a length (front of the crankshaft pulley extension to rear of flywheel housing) of 37 $\frac{1}{4}$ in., a width overall of 34 in. and height overall of 28 $\frac{3}{8}$ in. Its weight less starter and fuel filter is 831 lbs., or 9.55 lbs./bhp.

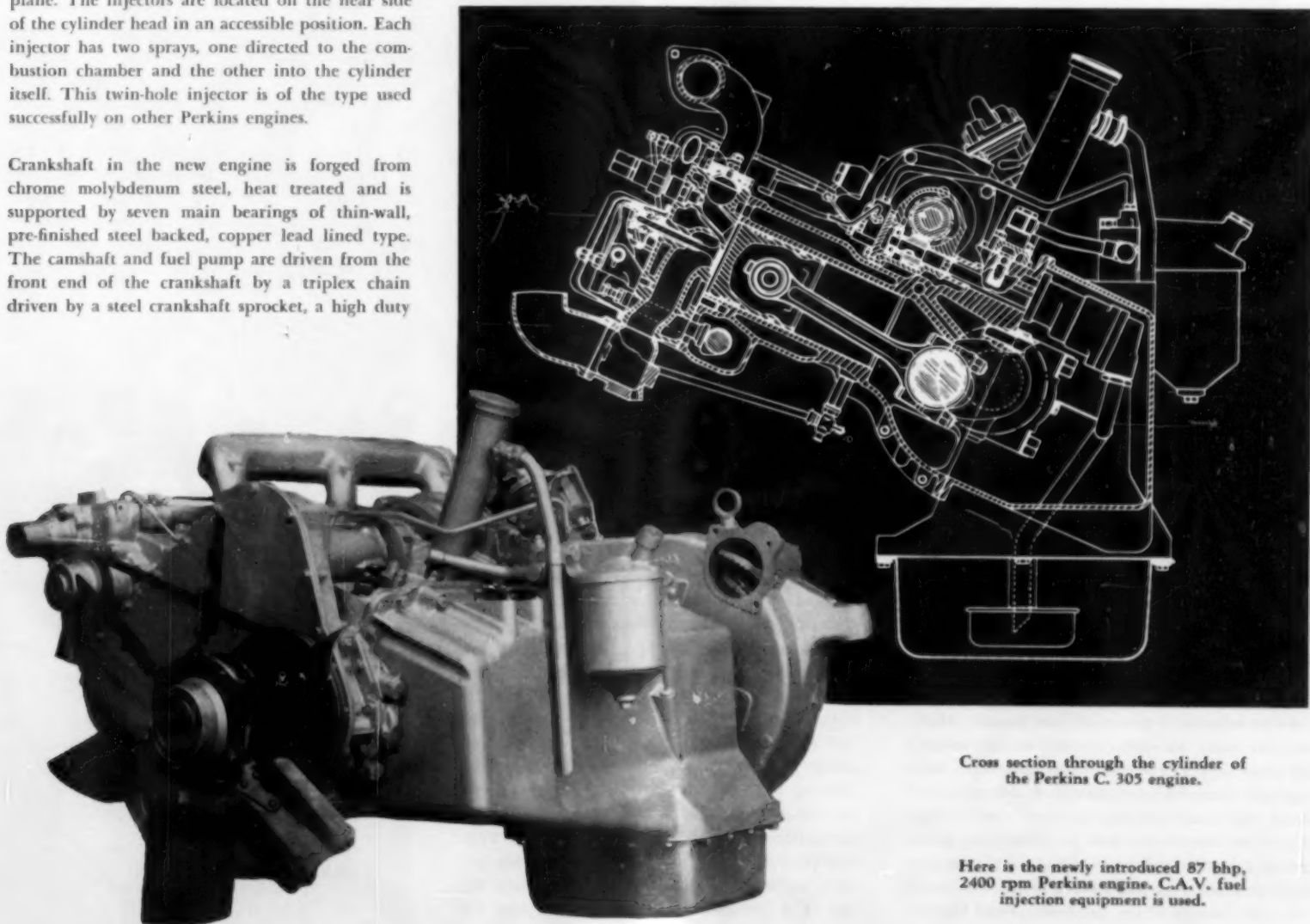
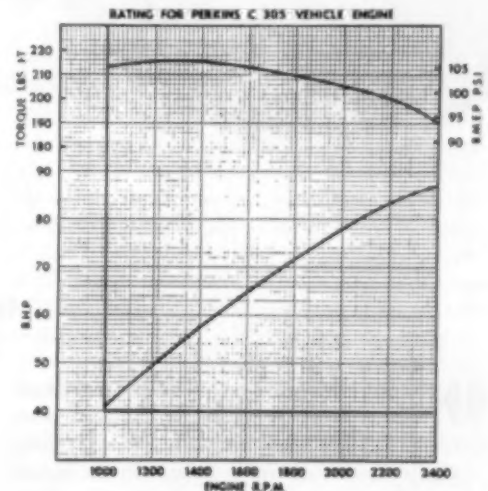
The C. 305 in-line engine is fitted with a flange-mounted C. A. V. distributor type fuel pump, which has a single element and does not require phasing. A hydraulic governor is incorporated in the fuel pump body with the speed control and cut-out levers mounted on the side of the pump housing. When the engine is installed, the controls and center line of the pump are in a vertical plane. The injectors are located on the near side of the cylinder head in an accessible position. Each injector has two sprays, one directed to the combustion chamber and the other into the cylinder itself. This twin-hole injector is of the type used successfully on other Perkins engines.

Crankshaft in the new engine is forged from chrome molybdenum steel, heat treated and is supported by seven main bearings of thin-wall, pre-finished steel backed, copper lead lined type. The camshaft and fuel pump are driven from the front end of the crankshaft by a triplex chain driven by a steel crankshaft sprocket, a high duty

cast iron auxiliary drive sprocket and similar type camshaft sprocket. The chain drive has a tensioner which operates on the ratchet principle and takes up slack automatically. An auxiliary drive shaft located on the near side of the engine drives the lube oil pump, exhauster via flexible coupling, fuel lift pump and fuel injection pump. The exhauster and fuel pump are driven inline.

Pistons on the C. 305 are of high silicon aluminum alloy, each fitted with five rings. Three compression and one scraper ring are located above the piston pin and one scraper ring below. The second and third compression rings are taper faced. The connecting rods are high tensile steel with "H" section shanks and the renewable steel liners are chrome plated for long life. High pressure forced feed lubrication is provided by an eccentric lobe-type oil pump, shaft-driven from the auxiliary drive by skew gears. All passages are rifle-drilled and an auxiliary oil feed line assures adequate feed to the valve gear. The lubricating oil filter is of the paper element type and incorporates a bypass relief valve. For proper cooling in all operating conditions, a centrifugal type water circulating pump is installed on the front of the cylinder

head and is belt-driven from the crankshaft. The pump has a curved vane impeller to prevent cavitation at maximum engine speed. Incorporated in the water pump outlet connection is a capsule type thermostat to permit maximum flow and assure rapid warm-up. The engine is designed for 12 volt electrical system with the generator and starting motor supplied by the customer.



Cross section through the cylinder of the Perkins C. 305 engine.

Here is the newly introduced 87 bhp, 2400 rpm Perkins engine. C.A.V. fuel injection equipment is used.



WHAT'S GOING ON IN ENGLAND

CONDUCTED BY BERNARD W. LANSDOWNE

Bernard W. Lansdowne is an associate member of the Institution of Mechanical Engineers and is widely known among British and European diesel manufacturers as a former editor of our English contemporary "Gas & Oil Power." His early workshop training was spread over seven years with A.E.C. Ltd., Southall, following which he served some five years with that company's sales engineering department. He is now manager-for-the-United Kingdom of a group of business and technical publications.

Gardner's New Six Cylinder Design

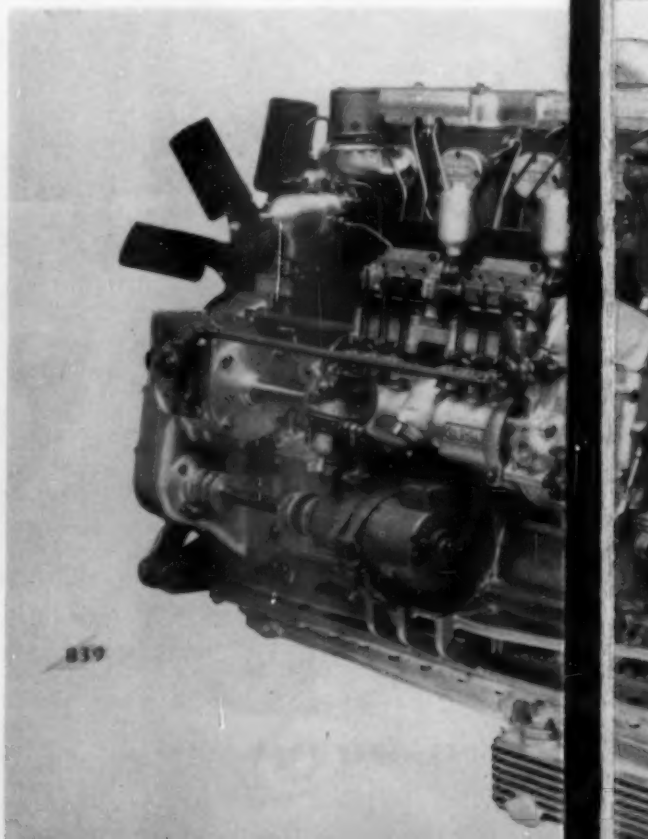
ONE of England's best known ranges of diesel engines is produced by Norris Henty and Gardners at Manchester and many successful fleets of road vehicles, together with innumerable industrial applications make use of Gardner diesels as their prime mover. A new and more powerful six-cylinder diesel has now been added to the Gardner range that provides higher power for a host of commercial applications. The new engine has a 4¾ in. bore by 6 in. stroke and its rated output at 1,700 rpm is 150 bhp. Engine construction is built up on a cylinder block cast in special ductile high tensile cast iron into which are pressed dry type liners. It is of a very rigid design with ample water space and directed flow around the cylinders. Cylinder head studs are of large diameter, evenly spaced and close to the cylinder bores. Cooling water passes from the cylinder into the head via small spigot tubes and synthetic rubber joint rings, so that the steel and asbestos gasket is not called upon to make a water joint and the surfaces do not suffer from corrosion. The jackets are easily accessible for cleaning by the removal of large diameter cast-iron plugs. The cylinder block is bolted to the crankcase by large high tensile through bolts, which extend through the crankcase and form the main bearing cap studs. This separate construction of cylinder and crankcase it is claimed, permits the use of an aluminum crankcase with which it is possible to provide greater rigidity than with cast iron, and at the same time secure a saving in weight of some 300 lb. The high relative expansion and heat conductivity of aluminum moreover, permits small initial bearing clearance and rapid dissipation of heat. The crankcase is free from stress concentration and has very substantial ribs inside and outside, which, together with its deep vertical section ensures adequate support for each crankshaft main bearings with a minimum of crankshaft deflection and stress. The main bearing caps are cast in high tensile aluminum alloy and are fitted with girder section forged steel bridges spreading the support from the through bolts. Passing across the crankcase and through all but the flywheel end bearing

cap are fitted two transverse bolts (per bearing) which provides a further powerful addition to the rigidity of the bearing housings and general structure of the engine.

The forward end of the crankcase contains the timing drive to valve camshaft and fuel pumps, also the drive for water pump, dynamo and exhaust. To the rear end of the crankcase can be fitted varying types of endplate. The type of endplate used is dependent upon the gearbox, clutch, and mounting arrangement. The engine structure is closed at the lower face of the crankcase by a magnesium alloy oil sump containing the oil reservoir, surge baffles and large area gauze strainer. The sump is available in many different designs having the oil containing portion of varied shapes situated at either end, or in some intermediate position, all of which are so arranged that sediment-free oil is drawn by the oil pump. To facilitate heat dissipation for high duty applications the sump can be very extensively finned on the external surfaces and provided with facings for flow to, and return from the oil cooler pump. The pistons are cast in a medium silicon aluminum alloy having a low coefficient of expansion and high resistance to wear. Careful heat treatment gives this material its most suitable physical properties, together with consistency, during the piston's life.

Fuel injection is direct into the hemispherical combustion chamber formed in the top of the piston to which are fitted two pressure rings and one oil control ring. The ½ in. dia. hollow piston pin is a hand push fit in the piston when cold and a sliding fit when warm. Connecting rods are die stampings in high tensile alloy steel. They are of "H" section, machined and polished all over and subject to 100 percent flaw detection inspection. The big end is of two bolt design and the rods are rifle drilled from end to end to provide forced lubrication to the bronze small end bearing. Thin wall steel shells, pre-finished and lined with specially surfaced copper-lead are fitted to the big end. The crankshaft is fully machined and has

large diameter hollow main journals and crankpins joined by stiff webs. The crankshaft is not locally or surface hardened and it runs in seven white metal-lined bearings with bronze shells and one roller bearing at the forward end. The rear end is provided with a large diameter coupling flange to carry the flywheel. The forward end of the shaft carries the triplex chain sprocket for the timing and auxiliary drives and the Vee groove pulley for the fan drive. Also at the forward end is a friction type torsional vibration damper enclosed within the crankcase. Oil is led from the main bearings to the crankpins by means of steel tubes pressed into holes drilled across the shaft from journal to pin. This arrangement ensures that there are no pockets where sludge can accumulate, which could eventually break away and block the oil passages, etc.



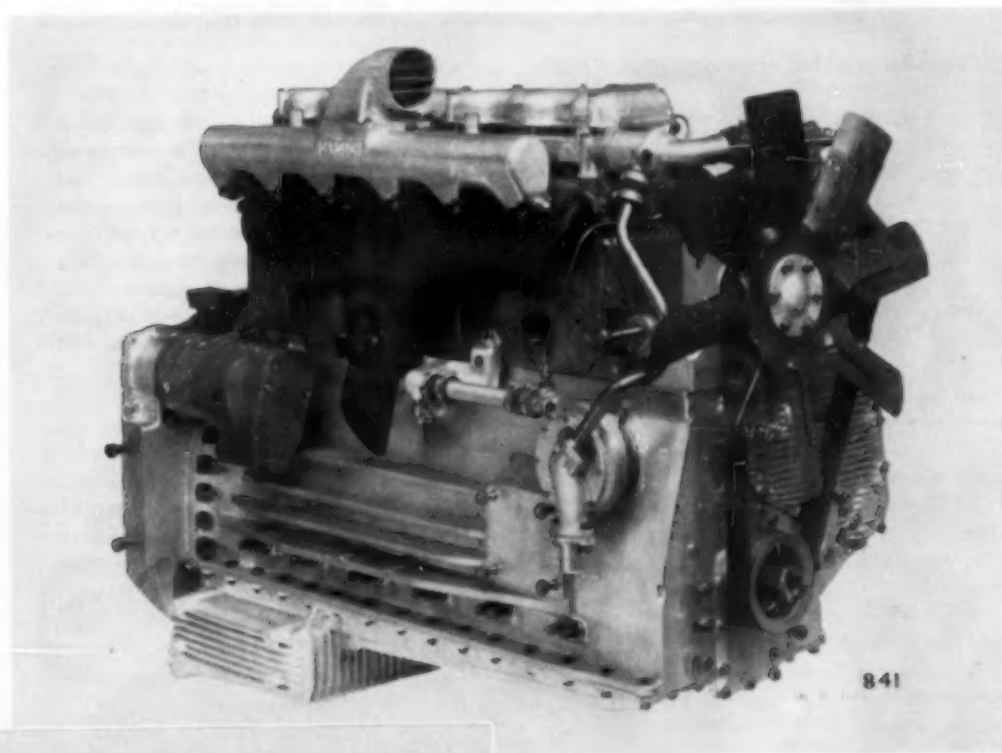
Closing the cylinders at the top are high tensile cast iron cylinder heads which carry the overhead valves, valve levers and fuel sprayers. Special purpose hard alloy iron inserts are pressed into the heads to form valve seats. The valves and push rod ball ends are lubricated from the hollow case-hardened valve lever shaft via passages drilled in the case-hardened valve levers. To ensure that the correct amount of oil is fed to the valve stems within narrow limits, the oil is fed through a relatively large hole to the top of the valve lever and from here the oil flows along a specially machined flat on the upper edge of this lever. The amount of oil reaching the valve end is determined by the flat width and not by the size of a hole which would of necessity be only small and therefore liable to stoppage. The inlet valve is slightly larger than the exhaust valve and carries a masked por-

tion which, in conjunction with the carefully controlled shape of inlet passage, produces the correct degree and direction of turbulence within the cylinder. The valves are returned to their seats by duplex valve springs and operate in renewable valve guides. Means are provided for decompressing by slightly lifting all inlet valves; this is of assistance in hand starting or when it is desired to turn the engine during servicing adjustments. The cylinder-heads are fitted with shallow polished aluminum covers and because of head design these covers are not required to make an oil-tight joint. The covers embody a molded synthetic rubber grommet to provide a dust-proof seal at the point of entry of the fuel sprayer pipes.

The fuel injection pump is made up from the rams and valves of the well-known C.A.V. type

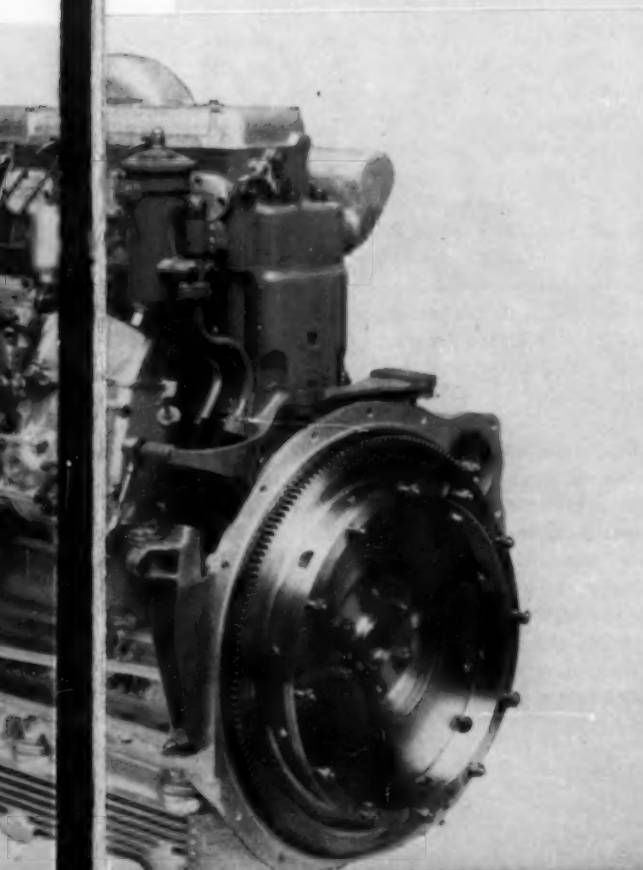
the accelerator is operated, and the timing is thus varied automatically with engine speed. The lubrication of this unit, which also embodies the governor, is effected by the continuous circulation of a large volume of oil from the main pump, and does not require individual attention. The governor itself is of simple construction, consisting primarily of two flyweights loaded through a ball thrust race by a compression spring. The action of the accelerator varies the speed and/or torque of the engine by means of a lever and rod connecting the governor to the fuel pump. In addition to providing a steady idle and maximum speed control the governor also controls the engine at all intermediate speeds. The unit can be overhauled by normal workshop facilities without highly specialized knowledge. The accelerator cam spindle and other moving parts are automatically lubricated from the internal circulation of excess oil from the engine oil pump. The governor, its operating mechanism and its connections to the fuel injection pump are totally enclosed by means of a cast aluminum cover. The fuel injectors are of simple construction and the valve which seats on the inside of the spray nozzle is of the two diameter differential area type held down on its conical seat by a compression spring. The fuel, after passing through a small strainer at the top of the sprayer, is led through drilled passages in the sprayer body to a point where it lifts the valve and passes through holes in the nozzle into the combustion space in the engine cylinder. The sprayer is held in the cylinder head by means of one stud and a clamp lever, the sprayer nozzle cap making a metal to metal gas-tight joint on a conical seat at the bottom of the sprayer hole in the cylinder head.

Pressure lubrication throughout the engine is supplied by a pump located on the lower part of the crankcase adjacent to the oil sump. It is driven from the valve camshaft through helical gears and a vertical shaft. The pump is of the gear type in which the driven gear meshes with an idler, the two being enclosed in a cast-iron body. Where engines are required to operate at extreme angles to the horizontal, the oil pump can be arranged to embody a secondary pump for the purpose of returning oil from the low end of the sump to the compartment from which the pressure pump draws its supply. Under very severe conditions where an engine is required to operate for long periods at high speed and under sub-tropical conditions, an oil cooler should be provided. For the purpose of circulating oil from the sump through a cooler, there is provision for mounting a gear type pump on the fuel pump cambox. This pump is driven by helical gears from the fuel pump camshaft. The camshaft is chain driven from the front end of the crankshaft and is carried in seven white-metal-lined bearings in the crankcase and one roller bearing in the timing cover. The inlet and exhaust cams are made in pairs and fixed to the camshaft by means of special setscrews. This separate construction of cam and shaft enables the cam profile to be readily reground and stored for future overhauls. The cams operate tappets which are carried in cast-iron guides fitted to the crankcase and held in place by means of studs and clamps. The tappets operate the valve levers through the medium of light, tubular steel, ball end push rods.



Right and left hand sides of the new 150 hp, 1500 rpm Gardner diesel. C.A.V. fuel injection equipment is used.

BPF fuel pump which in turn are operated by means of Gardner cams and tappets. The C.A.V. blocks of pumps are mounted as a pair and, interposed between the pumps and the cam box, is a light plate to which the pumps are dowelled, so that a pair of service pumps can readily be fitted to any engine. In addition to each ram return spring, each fuel pump tappet is spring loaded. Each separate fuel ram is provided with a hand-operating lever for priming the system and testing the action of the sprayers without their removal from the engine. The fuel pump camshaft is driven through a helical gear which meshes with a similar gear mounted on the valve camshaft. The gear is free to slide on a helical spline on the fuel pump camshaft. The gear is moved axially as





D DIESEL SERVICE PROGRESS

A COMMENTARY BY GEORGE R. MACKEY

George R. Mackey was long associated with Detroit Diesel Engine Division of General Motors Corp., and had prior experience as a mechanic in Europe and the U.S.A., which enabled him to become well acquainted in the diesel and service fields and to obtain a broad scope of the service industry from the customer's and management's viewpoint. Further training at Carnegie Tech and in the Army Ordnance during World War II provided the necessary requirements in planning service programs. Progressive advancement in diesel service areas in General Motors and with Detroit Diesel led to his position as Supervisor of Service Promotion. Upon termination of employment with General Motors in 1952, he joined Clayton Manufacturing Company, and his present position with this organization is Sales Manager of the Dynamometer Division.

Value of Labor-Saving Tools

LABOR saving tools and equipment have a very definite effect on the service shop's productivity, and they are looked upon as an absolute necessity in a modern service operation. Items that would be classified in the category of labor-saving tools and equipment are: valve refacing machines, electrical testing equipment, battery quick chargers, miscellaneous pullers, and many others. To evaluate the benefits of a typical labor-saving piece of equipment, we have only to think of a valve facer. While it is possible, through slow tedious hand lapping, to provide a fairly satisfactory valve seat, the time saved by using a modern valve facer will more than pay-out the investment in a very short period of time. One very important factor that must be considered when purchasing a piece of equipment, regardless of its cost, is—will it do the complete job? will it be easy to use? will it require a minimum amount of maintenance?—and others.

Since we previously used a valve facer as a comparison with hand labor, a number of features pointed out by Harry E. Stiver, Shop Foreman at Missouri Valley Construction Company, contractors of Grand Island, Nebraska, emphasized the importance of having the proper type of labor saving equipment to meet the shop's total requirements. Mr. Stiver states:

"We purchased our Sioux Model 682 valve facer about 5 months ago because we needed its capacity to handle the largest size valves from our largest and heaviest piece of equipment. Although we had a standard bench model valve facing machine for more than thirteen years previously, it couldn't do the bigger jobs such as valves with a stem diameter larger than $\frac{1}{8}$ in. Since a large portion of our heaviest equipment is powered with engines having valves with large diameter stems, and some of them with stems longer than could be chucked in the former machine, it was quite obvious that we would have to have the larger capacity equipment if we expected to properly service all of our equipment. Stem

Tools and Equipment

diameter and length are not the only important factors that had to be considered. Valves with head sizes larger than 2 in. diameter require much more power to do a good grinding job than do valves with smaller diameter heads. Since our new machine is powered with a one horsepower electric motor, as compared to only one-third horsepower in the former bench model machine, we are enjoying a 25 percent savings in time grinding the larger type valves. While this saving of time is naturally very important to our total shop productivity, the better finish on the reground valves and the elimination of disfiguring chatter marks is helping us to up-grade the quality of the jobs completed in our shop. By actual comparison with factory-new valves, we have found that valves refaced on the new machine have a better finish to many brand-new, unused valves from the factory. Our new machine enables us to achieve a significant improvement in grinding accuracy while maintaining very close seat concentricity on valves with heads larger than 2 in. diameter.

Dressing the grinding wheel is a very simple, easy operation as the wheel dressing attachment and dressing diamond seldom has to be removed from the machine and can be left in place during almost all normal valve refacing operations and rocker arm refacing. On the former machine, it was necessary to set up and take down the grinding wheel dressing attachments each time the wheel needed dressing, which resulted in much of the machinist's time being spent in non-productive labor. This feature of our new machine also contributes to the overall productivity of our shop. In our shop we service valves from a very diversified range of engines ranging from small air-cooled engines all the way up to the largest heavy duty diesel engines. This results in almost as many different sizes of valves as there are different size engines. All of these valves can be reworked on the new machine. A similar variation in the sizes of rocker arms used on valve-in-head or OHV engines are also serviced on this machine. This new ma-

chine plays an important part in keeping our shop productivity up and our machinery on the go, regardless of how large or small the equipment may be. Naturally, anything that helps us keep our equipment in top operating condition will also eliminate down-time, and that alone is sufficient justification for purchasing the best machines and tools to maintain the power and performance of the best equipment we can use."

The value of proper labor-saving tools and equipment cannot be over emphasized as the time saved can result in increased productivity and, for the retail service operation, greater profits. Many Service Managers who would take the time to analyze their operations would be amazed at the amount of productive man hours lost through not having the proper labor-saving tools and equipment.

Value of Merchandising Tools and Equipment

While we normally classify tools and equipment as Standard Hand Tools, Special Tools, and Labor-Saving Tools, it is extremely important that we consider those types of tools or equipment that can be utilized as a merchandising media. This is especially important in retail organizations. Effective merchandising of many types of tools and equipment found in the modern service shop will also affect the total productive man hours sold. Among the standard items that can be considered as valuable merchandising equipment normally found in a completely equipped shop are dynamometers, diagnosis instruments, fuel pump and injector bench testers, etc. Many of these items will also come under the classification of labor-saving and quality workmanship tools and equipment. Regardless of the completeness of the shop's equipment, none of the items can be considered merchandising aids unless they are effectively promoted. If a customer is properly informed of the tools, equipment and facilities available, he will be favorably impressed. This will materially affect total customer sales, which will, in turn, increase productive man hours, service volume and service profits.

1600 HP TUG JOINS TURECAMO FLEET

DESIGNED by Meritt Demarest, Jersey City, N.J., and built by Jakobson Shipyard in Oyster Bay, N.Y., the *Frances Turecamo* is the first tug in the New York harbor with a Wichita Clutch to be used for steamship docking. Power for the vessel is supplied by a 1600 shp GM Cleveland Diesel model 567C. Owned by the Turecamo Coastal and Harbor Towing Co., Inc. of Wilmington, Del., the *Frances Turecamo* is operated by the B. Turecamo Towing Co. of Brooklyn. Both the holding company and the operating company are headed by Barney Turecamo. His two sons, Vincent and Bart, are associated with him.

The Cleveland diesel propelling the tug is a two cycle engine with 16 cylinders and attains its rated shaft horsepower at 800 rpm. It is direct-connected to a Wichita Clutch assembly and a Falk reverse-reduction gear unit with a ratio of 3.45:1. The propeller is manganese-bronze, three-bladed with a 8 ft. dia. According to the engine builder, the advantages of a Cleveland Diesel with the Wichita Clutch assembly are: 1. Positive control of propeller speed throughout its entire range; 2. Smoother operation with single, remote lever control; 3. Quick response, and 4. Reduced maintenance cost. Commenting on the equipment, Bart Turecamo said, "The new installation on the *Frances Turecamo* will prove very successful in

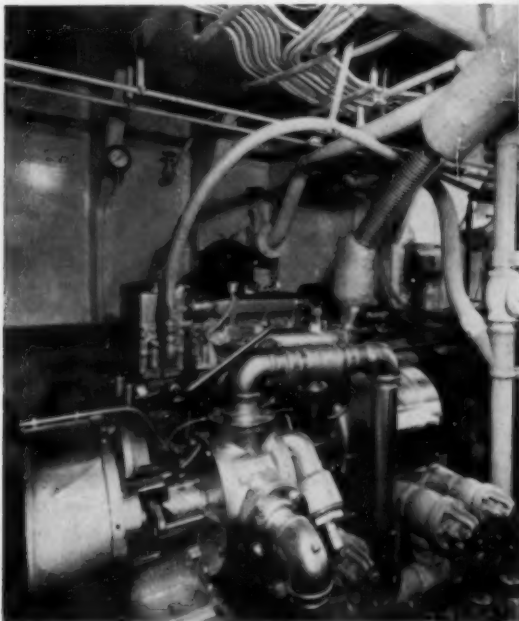
our type of towing service, because the tug can take up a tow at a throttle point much lower than can be reached with other equipment."

The new Turecamo tug has a length overall of 90 ft. 4¾ in. with a beam, molded of 24 ft. and a depth, molded amidship of 11 ft. It was built with a retractable pilot house for greater flexibility in operating on the New York State Barge Canal. This tug will be principally used for towing barges of oil and chemicals through the Canal and on the Great Lakes. In the winter, it will be in general coast-wise and harbor towing service, principally in the New York, Baltimore and Norfolk harbors. Equipped with pilot house control, the *Frances Turecamo* also has a remote engine con-

trol on the afterdeck. Since the Turecamo Fleet operates along the coast and on long towing operations, this tug has three double staterooms for the engineers, oilers and deck hands and a single stateroom for the cook. The captain's stateroom adjoins the pilot house and has quarters for two persons.

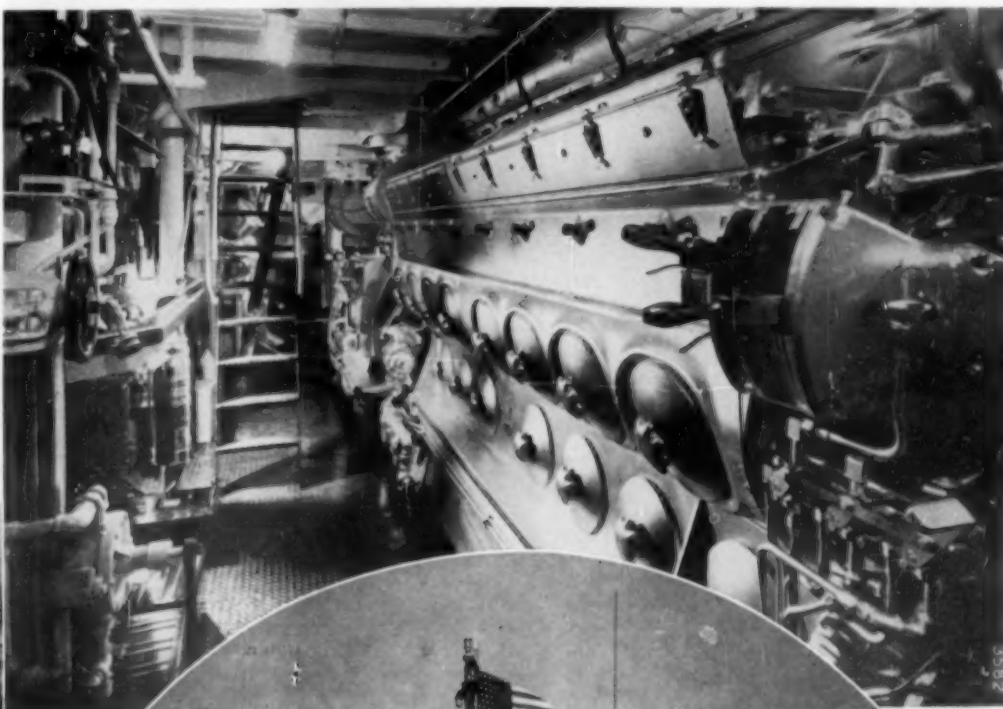
Latest navigation and communication equipment is aboard including radar, direction finder, radio telephone, VHF radio telephone and two searchlights, each 750 watt. Power for ship's service is provided by a GM model 3016A diesel engine that drives a 25 kw, 120 volt, dc generator and 200 gpm bilge and ballast pump. An aft end generator, also 25 kw, but 125 volt, dc, is belt-driven from the main engine.

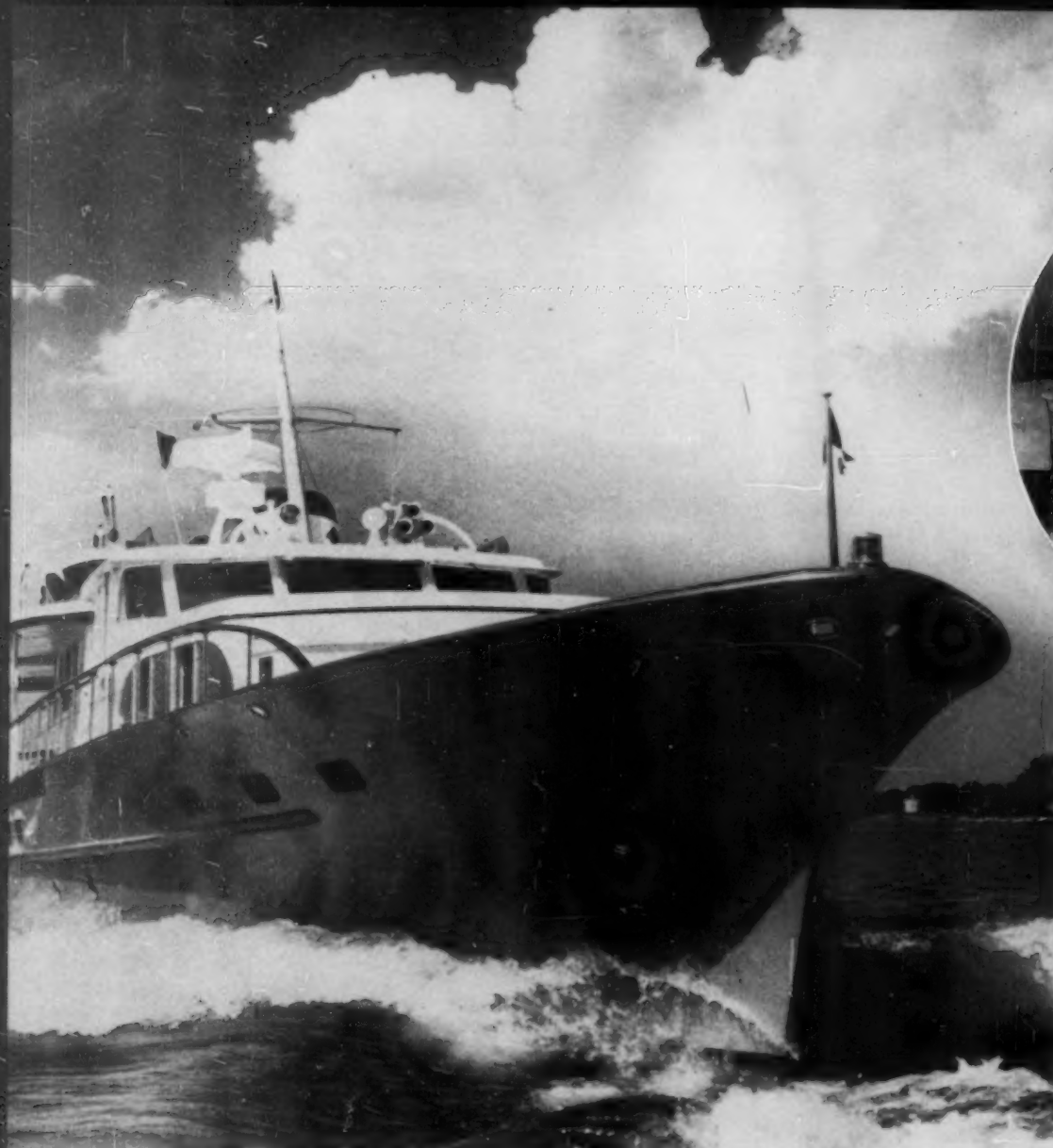
Starboard view of the Cleveland Diesel 1600 shp engine propelling the *Frances Turecamo*. Engine is equipped with Wichita Clutch and Falk reverse-reduction gear and Briggs lube oil filters.



GM auxiliary engine drives 25 kw generator and 200 gpm Viking pump.

The new Turecamo tug with pilot house in raised position.

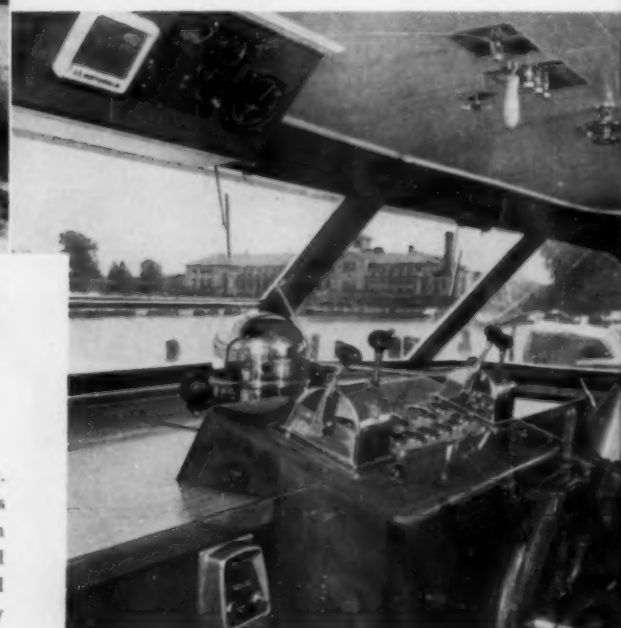




Shown through a large mirror is a portion of the *Seven Seas'* beautifully appointed dining salon.

Photographed in Lake St. Clair, prominent yachtsman Charles F. Johnson's 90 ft. *Seven Seas* has a top speed of 14 knots and a cruising range of over 1400 miles.

Pilot house of the *Seven Seas*, Detroit Yacht Club is visible in the background.



TWO OUTSTANDING YACHTS

By JIM BROWN*

WITH Boat Show time dead ahead and many fine craft scheduled for their premier, it's interesting to recall the high-pitched activity centered in rapidly growing marinas or one of the Yacht Clubs along the Detroit River in Michigan. Here near Detroit you can enjoy the trim, graceful lines of many beautiful yachts and other pleasure craft which owe much of their safety, reliability and out-and-out usefulness to efficient diesels below deck. Some of these boats are local, but many hail from far-flung home ports including New Orleans, Houston, Galveston, Tampa, Palm Beach, Miami, Fort Lauderdale and eastern cities all the way up the coast. Two yachts, in particular, caught my attention—the *Seven Seas*, one of the largest pleasure boats built in this country during the past few years, and the *Halmaga III*, a fine example of a slightly less customized, 55 ft. production line diesel cruiser.

The *Seven Seas* is a 90 ft., custom built all-steel yacht built by the Burger Boat Co. of Manitowoc,

*Midwest Editor, *Diesel Progress*

Wis. for Charles F. Johnson of Palm Beach, Fla. Largest steel cruiser ever built by Burger she is a fine example of design, craftsmanship and finish from keel to mast and from stem to stern. Designed by naval architect Jack Hargrave of Rybovich and Sons, Palm Beach, Fla. she offers cruising luxury and performance on a par with almost any U.S. craft you could name and her modern lines are sure to excite comment wherever she goes. Completed in July of 1958, the *Seven Seas* was 12 months in the building, most of which time the work was under the scrutiny of owner Johnson and she is his tenth all-custom boat. When in Detroit she had completed "shakedown" cruises on Lake Michigan and Georgian Bay and was to leave for fall cruising in the New York area and New England waters before following the birds south. During the winter she is based at Palm Beach, cruising from there to the Bahamas and to various points in the West Indies.

The *Seven Seas* has a 20 ft. 8 in. beam and 5 ft. draft. Two General Motors 6-110 diesel engines with GM hydraulically operated reverse and re-

duction gears in 3 to 1 ratio turn her two Columbian 5-blade 38 x 34 propellers. Her fuel tanks hold 2000 gal. which gives her a cruising range of 1400 miles at 1700 engine rpm. At this speed the GM 6-110 engines have a combined shaft horsepower of 520 with a maximum rated shp of 578 at 2000 rpm. Cruising speed of the *Seven Seas* is 12 knots; top speed is 14 knots. Spacious upper living quarters include an 18 x 22 ft. salon, a 12 x 15 ft. dining lounge, a light, beautifully appointed galley and an after deck open from port to starboard. The interior is walled with custom-finished mahogany and walnut panels, is carpeted throughout and contains modern "Heritage" furnishings. Guests have a choice of entertainment

from television or hi-fi music and radio. The galley features a liberal use of stainless steel and contains two double-oven ranges, a double sink and refrigerator and deep-freeze compartments of 16 and 17 cu. ft., respectively. From the upper living quarters access to the staterooms below is by means of a unique, space-saving circular companionway. Two double cabins, each equipped with bath and shower and a double master bedroom which occupies the full width of the stern section make up the owner's and guests sleeping quarters. The Captain and crew are also well provided for with their own dining nook and forecabin forward. The forecabin has four built-in berths, a shower and generous locker space for each member of the crew.

Adding to the comfort and convenience aboard ship, the *Seven Seas* has heating and air-conditioning throughout and telephone communication to the four main sections of the craft. Equipped with Bendix automatic pilot, radar, ship-to-shore radio, automatic direction finder and a Raytheon fathometer, the mahogany-finished pilot house is equipped with every possible aid to safe navigation. Also aboard ship are two outboard motorboats, used as tenders when anchored offshore. Besides her matched pair of GM Diesel propulsion engines mentioned above, the engine room contains 24 volt starting batteries, a 40 gal. hot-water heating system and a 115 volt battery system

man of Grosse Pointe, Mich. She is a 55 ft. cruiser with 14 ft. 10 in. beam and a draft of 4 ft. She is powered by two General Motors 6-71T (Turbo-power) diesels giving her a combined rated shaft horsepower of 600 at 2300 rpm. Going "all out" she achieves a top speed of 23 mph, and she cruises at 18 mph with the engines cut back to 1800 rpm. Cruising, she uses approximately 22 gal. of diesel fuel an hour. The *Halmaga III* sleeps 10 and is primarily used as a family boat. During the summer of 1958 she made an extensive cruise of the Georgian Bay area and over into Lake Michigan.

and-stainless-steel galley is up forward and sleeping quarters in the after section consists of three private double cabins each with connecting shower and bath. In addition to powering the boat, the GM Diesel engines also drive a 5 kw generator while underway. The craft is equipped with three 110 volt electric heaters, a hot-water system and a 32 volt battery starting system. While *Halmaga III* is Chapman's third cruiser, she is his first with diesel power and he is positively lyrical about this feature of his boat. He acknowledges a completely new sense of security and safety.



Halmaga III, 55 ft. Chris Craft Constellation, is a familiar sight around the Grosse Pointe Yacht Club. She is powered by two General Motors 6-71 T diesels.

◀ Compact 300 bhp GM 6-110 Diesels in the *Seven Seas*' engine room. Engine room is completely insulated for sound and floored with aluminum non-skid gratings.

to operate fresh and salt-water pumps, winches, radar and other electrical equipment. A 3 kw battery-charging generator belt-driven off the port engine furnishes electrical power while underway and a 10 kw Waukesha diesel generator set also supplies electricity for the yacht's needs. When ac current is available at the dock, a Constavolt converter unit changes it over to dc power.

By comparison with the *Seven Seas* just described the *Halmaga III* would appear considerably smaller but she is far from being what is today considered a "small" cruiser. A 1957 model Chris Craft Constellation, *Halmaga III* was built at the Chris Craft factory at Algonac, Mich. for Harry J. Chap-

On the *Halmaga III* there is a 14 ft. x 13 ft. 8 in. living salon in which the furnishings include a portable TV, hi-fi radio and record player, also a baby electric piano, often played by Mrs. Chapman. Some of the handiwork in the bridge area reflects Chapman's flair for cabinet-making. Unlike many cruisers, enjoyment of the bridge is heightened by a large bridge seat which will accommodate six persons and which contains compartments for charts, tools and other articles of utility. A mahogany-finished instrument panel is mounted overhead directly in front of the pilot and a glassed-in counter at the pilot's left elbow provides for an orderly arrangement of navigation charts, etc. The completely-equipped formica-



On the *Halmaga III*, owner Harry J. Chapman and son Gary discuss and plot their next family cruise.

Florida Diesel News

By Ed Dennis

MODEL 687-C-18 P&H diesel engine rated 180 cont hp at 1800 rpm with a 100 kw Electric Machinery generator was installed for Base Communications at Patrick Air Force Base to be used as a standby unit. Diesel Equipment Serv-

ice at Orlando handled this fine installation.

AT BELLE Glade, Wedgeworth Farms Inc. received a General Motors diesel engine model 6030-C 164 hp for powering a G&H turbine low lift 36 in. 27,000 gpm, at 7 ft. head, water pump for irrigation purposes from R. P. M. Diesel Engine Co., Fort Lauderdale.

FOR the Ryder Trucking System, 15 Diamond T model 723-C. J. T. hiway tractors powered with model JT6B Cummins 175 hp diesel engines and 8 speed Fuller transmissions.

MERCEDES-Benz model 636 rated 36 hp at 3000 rpm was installed in the motor sailer built by Warren Baily, Paragon 2:1 r&r gears. Allied Marine of

Miami supplied the engine.

PORT Everglades Towing Co., which recently took over the towing at that port, has two 83 ft. tugs, the *Hollywood* and the *Fort Lauderdale*, powered with Enterprise diesels model DMQ36 rated 1200 hp at 300 rpm. These 6 cyl direct drive engines have Hilco Hyflo oil filters and Manzel lubricators.

MEEKINS Rock Products of Fort Lauderdale had a model 125-A Michigan front loader repowered with a General Motors 3057C diesel rated 96 hp. The torque converter is made by Clark.

FLEET of six model T. S-360 Allis-Chalmers motor scrapers powered with TDS.844 Allis-Chalmers 280 hp diesels is being used by the Coast Line Construction Co. near Punta Gorda for developing 2200 acres of land into sites for 6000 homes. An Allis-Chalmers HD21 tractor with a 225 hp A.C. diesel engine is used for push loading.

AT JACKSONVILLE, Paul Klein and Odell Cannon had a 220 hp model NH220 installed in their Autocar DC 75 T tractor while Jim Windrow of Auburndale had an NH180 diesel installed in his Diamond T, all from Cummins Diesel Engines of Florida.

AT LONG Key and Ramrod Key pumping stations, the Florida Keys Aqueduct Commission will install 2 each, Superior model 40-SX-6 8 1/2 x 10 1/2 turbocharged 6 cyl diesel engines to drive 8 in. Allis-Chalmers pumps through speed increasers. Normal pumping service will require 306 hp at 600 rpm and 113 bme. This makes a total of six Superior diesel engines to be installed for the aqueduct.

SHELLEY Tractor & Equipment Co. repowered a 1 1/2 yd. P&H dragline with a D342 Caterpillar diesel engine for Cate Contracting Co. of Hollywood.

TAMARICO Towing Co. of St. Petersburg had a General Motors 6-110 diesel with G. M. 4.5:1 r&r gears installed in their 40x12x6 towboat, *Addie B.* It drives a 52x48 three bladed propeller. General Engine & Equipment Co. of Tampa engineered the installation.

CITY of Jacksonville took delivery of a model 255-A P. & H. Harnischfeger dragline powered with a 387C-18 P&H diesel engine rated 80 hp at 1250 rpm. A Cotter two speed transmission was also included in the installation.

FLORIDA Georgis Tractor Co. delivered to Chesteen Powell of West Palm Beach a model H. U. Payloader tractor-shovel powered with an 84 hp Hercules diesel while a model H. H. D. Payloader

New 100-ft. General Motors Tug for Moran Towing & Transportation Co., Inc.



Designed By Marine Design Section, Cleveland Diesel Engine Division of General Motors. Built by Jakobsen's Shipyard, Oyster Bay, L. I.

"We chose General Motors power for the NANCY MORAN, our 58th tug, because it has proved itself the best kind of propulsion you can buy," says Admiral Edmond J. Moran, President, Moran Towing & Transportation Co., Inc.

"In a fleet this size we can't afford to make mistakes," says Admiral Moran. "Our customers know they can count on our General Motors Diesel-powered tugs for

peak performance and reliability. And we know they're tops in economy."

The new NANCY MORAN is powered by a 1600-horsepower General Motors 567C Diesel engine driving a five-bladed propeller through a Wichita clutch.

Wherever towing service requires dependable, efficient power, Cleveland Diesel engines are first choice today.

A GOOD PRODUCT PLUS GOOD SERVICE GIVES TOP PERFORMANCE

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Engine Division of General Motors • Cleveland 11, Ohio

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San Francisco, Calif.

Seattle, Wash.
Wilmington, Calif.

with a 92 hp Hercules went to W. T. Price of Miami.

AT WILTON Manor, the Stevens Market took delivery of a model 12103 General Motors diesel with a 200 kw Kato generator and the Atlantic Freight Co. of Miami received a 100 kw Delco generator driven by a 6150 G. M. diesel engine. Both are for emergency power use.

CITY of Homestead Municipal Power Plant gave its consumers a Christmas present by reducing the electric rates 20 per cent. The plant has Fairbanks-Morse generating units with a capacity of about 10,875 kw.

MAXWELL Gin Co. of Rydal, Ga. installed a Cummins diesel engine, to run the cotton gin power unit, model N. H. R. S. having a max hp of 320 at 2100 rpm and a cont hp of 220 at 1800 rpm; from Cummins Georgia Diesel Inc.

FOUR 53 ft. trawlers were delivered to Neptune Seafoods of Brownsville, Tex., by the Diesel Engine Sales Co. of St. Augustine. The 4 are identical in hull design and powered with General Motors 4-71-E diesels. The engines are called Efficiency models and are rated 110 hp and have Allison 4.5:1 r&r gears. Two have 42x32 four-blade Columbian propellers and two have 42x32 three-blade Wirkkala propellers.

BAGGETT Transportation Co. of Birmingham, Ala. had one of their Diamond T hiway tractors repowered with a model 487C-18 P&H diesel engine. This 4 cyl, 2 cycle engine is rated 200 hp at 1800 rpm and has a Fuller 5-A-650 transmission and Roosa-Master injection pump. Hooper Motors of Miami made the installation.

LLEWELLYN Machinery Co. has recently taken over the distribution of the Hercules line of diesel engines and will handle engines and parts throughout the state. Headquarters for the new Llewellyn-Hercules distributorship will be in Jacksonville.

NEW 4 cyl Ford model x220 diesel engine rated a max bhp of 68 was delivered to Blyth Bros. in Port au Prince, Haiti for use as prime power for a cement mixer.

New Marketing Vice President

Mr. Edward A. Malling has been appointed vice president of marketing at Flexonics Corp. according to an announcement by John F. P. Farrar, president. Mr. Malling was manager of marketing for the Specialty Electronics Components Department of General Electric, resigning after 23 years with G.E. to ac-

cept the Flexonics position. Mr. Malling is the author of the text, Marketing Timing. The position of vice president of marketing is a new one at Flexonics. The job was created as part of the new organization plan which Flexonics has been putting into effect during 1958. In this position, Malling will be responsible for Flexonics complete marketing program.

Sharpe Becomes Senior Vice President

Clifford A. Sharpe has been appointed senior vice president of American Bosch Arma Corp. according to announcement made by Charles W. Perelle, president of the corporation. Prior to this appointment, which becomes effective Oct. 1, 1958, Sharpe had been vice president of

operations, a position which he had held since being elected to that office May 1, 1954. During his career Sharpe has held various positions with Boeing Airplane Co., Consolidated Vultee Aircraft Corp. and Hughes Aircraft Co. He served as vice president of manufacturing for Gar Wood Industries and, later, as vice president of operations with the ACF-Brill Motors Co.

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West Coast News

By James Joseph

INSTALLED in the skiff *Determined*, commercial fishing net tender owned by San Pedro, Calif.'s Norman Mezin, a Volvo MD-47 driving 24x18 wheel thru 3:1 reduction. Sale by Auto Imports, Inc.

TO Weber Central Dairy Assn., Casper, Wyo., a Cummins NH-220 for installation in a Mack LJ rig. Sale by Cummins Diesel Sales Corp., Casper, Wyo.

FOR John S. Sima's boat *Anta Teresa*, operating out of San Pedro, Calif., a GM 6-110 main propulsion engine swinging 44x32 wheel thru 3:1 reduction.

POWERING the 40-bunk sports fishing boat *New Dina Lee*, operating out of San Pedro, Calif., are two GM 2-71s swinging 28x25 wheels thru 2:1 reduction, achieving 16 knots. Sale by Crofton Diesel Engine Co., Inc.

FOR Frank Hooykaas' boat *Barlovento*, Los Angeles its home harbor, a GM 4-51 as main propulsion.

HOOPS Construction Co., Elko, Nev., has installed a Mack NR4D with a Cummins NH-220, the sale by Cummins Intermountain Diesel Sales, Salt Lake City.

GAIL Pew, Phoenix, Ariz. has installed his Kenworth KLF 505 with a Cummins NH-220. Sale via Cummins Arizona Diesel, Inc., Phoenix.

STAR Kist Foods, Inc., Terminal Island, Calif., has purchased a GM 4-51 to power the purse seiner skiff, *Anthony M.*

TO E. J. Eason, Kennedy Lake, B.C., three Cummins NT-6-Bs for powering Hayes HD 25-70s, sale by Cummins Diesel Sales of British Columbia, Vancouver.

FOR Australia's Qantas Air Lines, 21 cart-mounted AiResearch GTCP 85-90 air-start turbines as ground equipment for the Electra turboprop transport. Turbines deliver 116 lbs/min. bleed air at 50 psia.

Hill Named Advertising Manager

Appointment of Frank S. Hill as advertising and sales promotion manager of American MARC Inc. has been announced by Denis Kendall, president of the California designer and manufacturer of diesel engines and generators. Mr. Hill was formerly assistant advertising manager of Fluor Products Co., a division of Fluor Corp., Ltd. Previously, he was assistant advertising manager of Pacific Finance Corp. A resident of Whittier, California, Hill attended Whittier College and U.C.L.A.

Offset Gears for Dredge

Westinghouse Electric Corp. has supplied two horizontally offset marine-propulsion gear drives for the U. S. Army's Corps of Engineers' seagoing hopper dredge, *Chester Harding*. The two reduction gearing units are each rated at 2120 shp at 375 rpm input and 190 rpm output. When the Corps of Engineers put this dredge into service in 1939, it was the first direct-connected, diesel-powered, seagoing hopper dredge incorporating the most modern features of dredging equipment. The dredge had a capacity of 2500 cu. yd. and its propulsion machinery consisted of two 1200 hp slow-speed diesel engines. Due to obsolescence and wear it was decided to replace the original engines with modern higher speed diesels and reduction gears. The horsepower rating of the new engines has been increased for higher dredging efficiency. The order for the units was received from the Enterprise Engine Division of General Metals Corporation, who built the new diesel engines for the dredges.



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DELTIC reliability, power, endurance and space-saving compactness are the reasons why really look-ahead oil men are revising their ideas of crew transportation. DELTIC-powered crew boats, carrying up to 50 passengers are speeding between land and oil rigs at 35 m.p.h. with plenty of power in hand for bucking wind and tide.

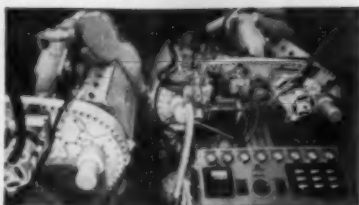
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The Deltic—most powerful engine for its size and weight in the world—makes possible this 50 passenger 35 m.p.h. crew boat.



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The Deltic is designed for easy maintenance—e.g., pumps replaced without retiming. Entire packaged power unit interchangeable for major overhauls.

NAPIER DELTIC MARINE DIESELS

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New York Offices Established

De Laval Separator Company, Poughkeepsie, New York, has established new offices for the direct sales of the company's industrial products in the New York City area. This function had been performed by the Turbine Equipment Company. The new offices will be temporarily located at 63 Vesey St. and will be headed by William Porch, De Laval's Eastern Division industrial sales manager. Mr. Porch joined De Laval in 1945 and was assigned to their Chicago branch as a field engineer. In 1946, he served as a sales engineer in the Minneapolis area. Mr. Porch was appointed manager of De Laval's Oil Purification Division in 1952 and in 1957 assumed his present position.

Flexible Connector Brochure

Bulletin recently released by Universal Metal Hose Co. provides complete specifications and prices on this company's very complete line of bronze flexible connectors. Designed to convey gases or fluids at temperatures up to 400°F. They are completely leak proof and, being of bronze, they are highly corrosion resistant. The outer cover is braided for extra strength. Such connectors are used to simplify misaligned hook-ups and to provide a flexible connector that will compensate for expansion or vibration. Flanged, solid male and female union connections are available, and inside diameters range from 1/4 in. to 4 in. For copies of this UC3 connector Bulletin, write directly to Universal Metal Hose Co., 2133 South Kedzie Ave., Chicago 23, Ill.

ITS NEW

Piston Ring Brochure

Piston Products, Inc. announces the availability of a new eight page brochure on its full line of open-joint, sealed-joint and lubricating oil control piston rings marketed under the name, Daros. Daros piston rings, made of Swedish charcoal steel, are available for all types of engines. The bulletin describes each of the major types and is fully illustrated with product and sectional line drawings. Copy of the brochure is available and inquiries should be sent to Piston Products Inc., 8128 N. Lawn-dale Ave., Skokie, Ill.

HERE IS IMPORTANT INFORMATION!

The completely new 1958 edition of the **DIESEL ENGINE CATALOG**, Volume 23, is now available. If you design, purchase, sell, operate or service diesel, dual fuel or gas engines, the Catalog is essential to you. This giant, 400 page, 10 1/2" x 13 1/2", fully illustrated reference book has been revised, rewritten and brought up to date completely from cover to cover. Send your order in now for this limited edition, which costs \$10 postpaid plus California sales tax where applicable. Send checks or company orders to **DIESEL ENGINE CATALOG**, 816 N. La Cienega Blvd., Los Angeles 46, Calif.

W. D. Brumback Takes New Post

Appointment of William D. Brumback as vice president and general sales manager of American MARC Inc. has been announced by Denis Kendall, president of the California designer and manufacturer of diesel engines and generators. Mr. Brumback joined the company in April, 1958 as director of OEM sales.

Previously, he was west coast manager for Hercules Motor Corp. in the eleven western states. Before that he was export manager and then vice president in charge of sales for Hallet Manufacturing Co.

T. J. Kiely Named Manager

Mr. Thomas J. Kiely has been appointed Manager of the Chicago Regional

Sales Office of the American Bosch Division of American Bosch Arma Corp. Mr. Kiely joined American Bosch in 1921 and has served in various engineering and sales capacities. He went to the Chicago post from Cleveland where he was manager of the company's regional sales office in that city. Previous to that, he had been attached to the Chicago office for several years as a field engineer.

Pistons...

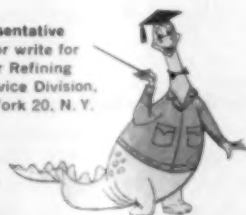


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The longer your pistons work before need of ring replacement—the less your cost of operation.

Sinclair Rubilene® Oils have the reputation for giving longer service to cylinders, rings and other vital parts. Refill with Rubilene now. Next time management asks how you've cut costs, tell them you've switched to Sinclair—and show them the results.

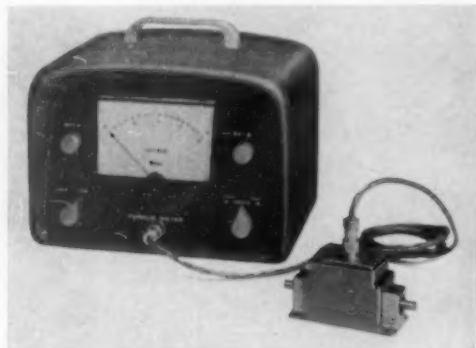
Call your Sinclair Representative for further information or write for free literature to Sinclair Refining Company, Technical Service Division, 600 Fifth Avenue, New York 20, N. Y. There's no obligation.



SINCLAIR Rubilene® Oils

New Metron Torquemeter

Torque ranges covered by Metron's new torque-meter are from 5 to 250 oz.-in. full scale. Special units for higher torques are available. These torque-meters measure dynamic torques on shafts turning between 50 and 12,000 rpm with an accuracy within 2 percent of full scale. Easy-to-read linear scales and simple calibration minimizes operator error. Torque readings are independent of

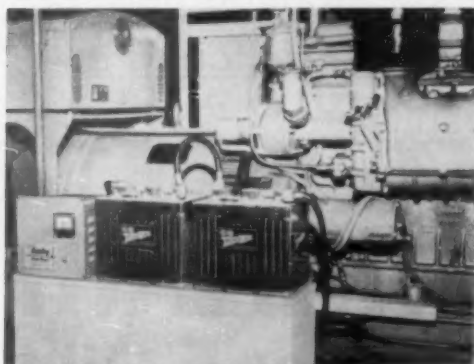


shaft speed and direction of rotation. Simple calibration adjustment provides stability against ambient changes and internal aging effects. For remote readings the indicator may be located conveniently and connected electrically to the compact torque pickup. This unique pickup imposes negligible bearing loads. And the over all design provides overload protection up to twice the rated load. Housings for pickups are $3\frac{5}{8}$ to 5 in. long depending upon the range required. Shafts are $\frac{1}{4}$ in. dia. and $\frac{7}{16}$ in. long. Metron torque-meters are ideal for laboratory, field or shop use—wherever dynamic torques must be measured quickly and accurately.

ITS NEW

Positive Starting For Standby Engines

New power package of C & D AutoReg silicon charger and PlastiCal batteries assures positive starting power for emergency standby engines. Both charger and batteries are specifically engineered to work together as efficient unit which guarantees full power when needed. The new power package requires virtually no maintenance, with up to 25 years of service, depending on the battery type selected. An innovation in the field of emergency starting power, the compact power package combines C & D's lead-calcium plate battery with C & D's new AutoReg silicon charger.



The combination is said to give many times the life of conventional charger-battery combinations. The power package of charger and battery comes complete with drip-proof housing for wall or floor mounting. Because of its simplicity, the AutoReg

charger requires only minimum space. In addition, C & D lead-calcium batteries when coupled to AutoReg chargers require watering no oftener than once a year. The new AutoReg charger actually performs as a constant-current charger until the battery is almost completely recharged. At that time, the constant-voltage characteristic takes command, forcing the charging current to decline very rapidly to the low float rate required for lead-calcium plate batteries. No manual switching is required. Charging voltage never exceeds the voltage at which a battery begins to emit gas, thus eliminating the basic cause of water dissociation. As a result, water additions are fewer, and maintenance is held to a minimum. High-efficiency silicon rectifiers used in conjunction with specially designed transformers and allied components provide ideal charging characteristics. Because the silicon rectifiers are hermetically sealed, charger operation cannot be affected. Aging taps are not required. In addition, the charger system can withstand a dead short across the output terminals for an indefinite period without damage to the charger or its components. The battery used in the combination unit is the same proven lead-calcium plate battery used in utility, telephone, carrier, and microwave installations, as well as for starting diesel locomotives. A sudden demand to start the emergency standby power engine merely discharges the battery over a short period of time. Once the engine is started, the charger goes to work putting energy back into the battery at a high rate until the battery levels off at a fully charged condition. For additional information, write to C & D Batteries, Inc., Conshohocken, Pa.

ITS NEW

Work Progresses On Airport Cloverleaf



Miami International Airport will have the solution to one of its big airport-traffic problems solved, when it opens the new multi-million dollar terminal in December 1958. The cloverleaf at the airport's new entrance, costing over a million and a half dollars, is scheduled for completion shortly before December. The John C. Peterson Construction Co. is using several of these TD24 International crawler tractors with hydraulic bulldozer blades and three stage hydraulic torque converters to hurry construction of the new cloverleaf. The Florida-Georgia Tractor Co. of Miami supplied most of the International dieselized equipment being used on this airport construction job.

Diesels For Foodstuffs Hauler

Emery Transportation Company, Chicago, one of the nation's largest contract haulers of foodstuffs, has placed in service 20 new six-wheel, cab-over-engine International diesel tractors with sleeper cabs as part of a fleet replacement program, and placed an order for 40 additional trucks of the

same model. Shown taking delivery of the first 20 model DCOF-405 tractors is Roger C. Thorslund (right), Emery vice president and superintendent of maintenance, who accepts keys from Walter J. Schauer, International salesman. The big contract carrier operates 500 tractors and 1,000 semi-trailers hauling mainly perishable food products from the Midwest to the East Coast and back-hauling dry foodstuffs. Ninety per cent of Emery's fleet is diesel powered and most of its trailers are



refrigerated. The firm has standardized on diesels, according to Thorslund, because it provides the dependability required, and the fuel economy desired for long distance, straight-through hauls with perishable commodities. Emery offers direct service to the East Coast in approximately 30 hours with its sleeper cab tractors with two drivers. Its fleet operates over 40 million miles a year. Milton Ratner is president of Emery and Midwest Transfer Company, which also is headquartered in Chicago. Emery's new International tractors are rated at 76,800 lbs gross combination weight. Their wheelbase is 143 $\frac{1}{2}$ in. and they are equipped with Cummins NHB-600 engines, Fuller Roadranger ten-speed overdrive transmissions, 34,000 lb double-reduction rear axles, 11,000 lb front axles and 80 in. sleeper cabs.

Announce New Tractor-Shovel

The Frank G. Hough Co., Libertyville, Ill., has announced a new four-wheel-drive, rubber-tired tractor-shovel with 7,000 lbs. carry capacity, the model H-70. This loader is already in production and will replace the model HH PAYLOADER. Features of the new H-70 include more power, more traction, stronger components, greater protection against dirt and dust, more efficient torque-converter, complete power-shift transmission, power-transfer differentials, power-steering, pry-out bucket action, safety boom arms, power-boosted brakes and numerous refinements. Power for the H-70 is supplied by either a 105 hp General Motors model 3-71 or a Cummins model JF-6-B1 rated 110 hp. To assure the fullest protection of the engine when operating in dusty conditions, the H-70 has a triple air cleaner system with a pre-cleaner and two oil-bath air cleaners. A cartridge-type oil filter is built into the hydraulic reservoir. Similar filters protect the engine oil, the transmission and torque-converter oil. The front service brakes are sealed to keep out dust, dirt and foreign matter. A new, larger torque-converter in the H-70 is closely matched to engine and transmission characteristics. It is a single-stage, two-phase converter with a torque-multiplication factor of 2.72 to 1 at stall. The Paylomatic power-shift transmission, designed and built by Hough, provides 3 speeds in each direction.

Cooper-Bessemer Names Gehres

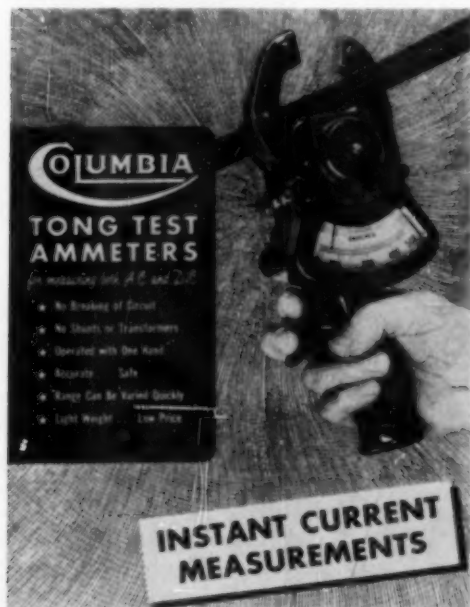


Freeman A. Gehres

Elevation of Freeman A. Gehres to the position of Branch Office Manager in New Orleans has just been announced by George W. Edick, Domestic Division sales manager of The Cooper-Bessemer Corp. Since the opening of Cooper-Bessemer's combined New Orleans office and warehouse in 1952, Gehres has been serving as assistant branch manager under T. E. Kraner who has now become president of C-B Southern, Inc., Cooper-Bessemer's new, wholly owned engineering and manufacturing subsidiary in Houston. Prior to his 6 year term as assistant manager, Mr. Gehres was a sales engineer for 4 years in Cooper-Bessemer's Houston office following 9 years of service as an application engineer in the company's Mount Vernon, Ohio headquarters. Thus, since joining Cooper-Bessemer in 1939 Gehres has acquired a rich background of experience for his new responsibilities in the fast developing New Orleans area. He is an engineering graduate of Ohio State University and before joining Cooper-Bessemer served as a Lieutenant in the U. S. Navy.

Tong Test Ammeter Catalog

A new 8-page catalog on its complete line of Tong Test ac-dc ammeters has just been released by Columbia Electric Mfg. Co. The new bulletin pictorially illustrates eight types of instruments



and gives detailed information on the selection, ordering and use of Tong Test ammeters, the only clamp-type ammeters that measure both ac and dc. There are actual size scale ranges shown to assist in the specification of desired ranges. Special tong tests for low current readings are also pictured and described. Bulletin includes prices and shipping weights as well as information on the low cost Columbia type AC-1 Volt-Ammeter and the new Columbia model UV-1 AC-DC Voltmeter, the latter for measuring voltages to 600 volts, ac or dc. Address inquiries to 4519 Hamilton Ave., Cleveland 14, Ohio.

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STRATOFLEX HOSE & FITTINGS

- Fuel Lines • Hydraulic Systems
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- Lubrication Systems • Water
- Coolants • Refrigerants

Made in a wide variety of sizes and types for hundreds of commercial and industrial uses, Stratoflex detachable and reusable fittings simplify maintenance and assure leak-proof connections under extreme temperature variations. Stratoflex hose provides the flexibility, small bend radii and durability essential for dependable service.

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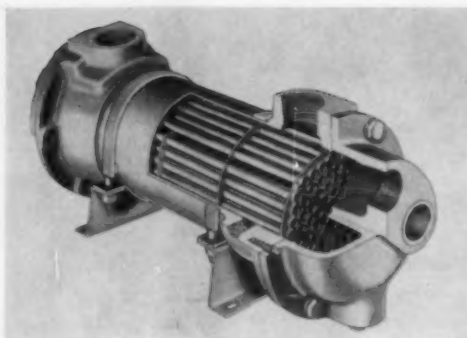
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Develop Heat Exchanger Line

Perfex Corp., manufacturer of heat transfer equipment since 1911, has developed and is now manufacturing a complete line of standard stock heat exchangers, known as Perfexchangers. This is an improved type of shell and tube heat exchanger in sizes from 1.3 to 200 sq. ft. of surface. The Perfexchanger design prevents bypass around the tube bundle, increasing efficiency 10 to 15 per cent. Optimum clearance between tubes, shell, and baffles, together with more efficient tube spacing, further increases efficiency over units now available, a Perfex spokesman said. An added feature is the universal mounting bracket, which is detachable and rotatable 360°. Perfexchangers are



available in single, two and four pass models in a complete range of sizes to meet a wide variety of applications.

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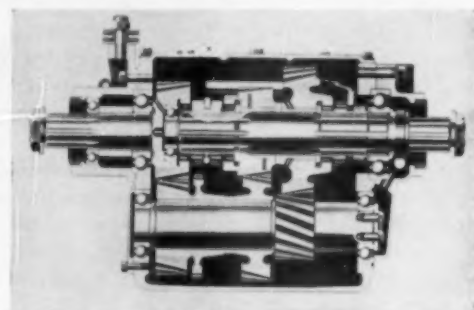
Joseph Lucas (Canada) Ltd., Head Office: 11 Davies Avenue, Toronto 8, Ontario

Branch Office: 3401 St. Antoine Street, Montreal 30, Quebec

A.P. 817

Transmission Line Expanded

Fuller Manufacturing Co. has announced expansion of their line of 3 speed auxiliary transmissions to include a total of 16 auxiliary units. Addition of nine new sets of gear ratios gives Fuller a complete line of three-speed auxiliaries. Designed for use in the transport, logging, construction, mining and crane carrier industries, the new transmissions are intended to provide the widest range of gearing options at lower prices than competitive units. The expanded line of Fuller auxiliaries includes splitting ratios, both underdrive and overdrive. With these splitting ratios, engines can operate at maximum horsepower through a full range of vehicle speeds. Ideal for over-highway operation, the extra gears allow faster schedules to be maintained. Deep reductions, in combination with splitting ratios, offer maximum flexibility both on



and off-highway, where the deep reduction is required for extreme grades and soft footing, and where splitting efficiency is required for traffic conditions. Fuller's rugged heavy-duty 92 series (for engines up to 920 cu. in. displacement) has been completed by the addition of five new sets of gear ratios, models 3-D-92 through 3-H-92. Four new sets of gear ratios, models 3-E-65 through 3-H-65, have been added to the medium-heavy-duty 65 Series. Ratios vary from .74:1 to direct drive in the high ratios and from 1.239:1 to 2.64:1 in the low ratios, with numerous variations in between. The new auxiliaries emphasize short overall length and lightweight. Fuller's model 3-A-65, for instance, weighs only 270 lbs. and is just over 19 in. long. Its counterpart in the heavy-duty series, the model 3-A-92, is 22 $\frac{5}{8}$ in. in length and weighs 350 lbs.

ITS NEW

New Chief Engineer at Nordberg



Paul J. Louzecky

Appointment of Paul J. Louzecky as Chief Engineer, Engine Division was announced by Robert E. Friend, President, Nordberg Manufacturing Co. Prior to joining Nordberg Louzecky was chief technical engineer for the Cleveland Diesel Engine Division of General Motors

Corp., a position he held since 1955. In his new position as chief engineer Louzecky is in complete charge of all engineering phases and all engineering personnel of the Engine Division, including installation, service, testing and research development.

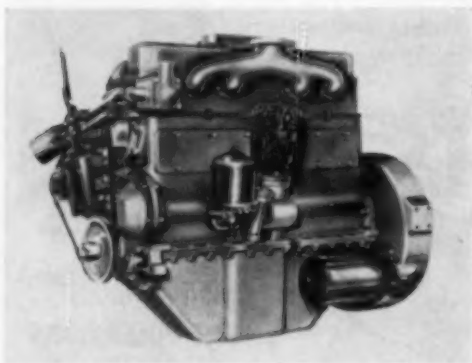
A graduate of Case Institute of Technology in Cleveland, Louzecky earned his B.S. degree in

DIESEL PROGRESS

Mechanical Engineering in 1932 and his Masters degree in 1933. Mr. Louzecky has an extensive and well rounded background covering approximately 23 years in the design and development of internal combustion engines, including diesel, spark ignition and dual fuel engines for commercial and marine applications. His former supervisory responsibilities included analytical design, vibration, instrumentation, engineering welding design, metallurgy, chemical laboratory and engine development. One of his most recent accomplishments was the development of a two-cycle, turbocharged diesel engine. He is actively engaged in various engineering society activities and is a member of American Welding Society, Society of Automotive Engineers, American Society of Mechanical Engineers, Society of Experimental Stress Analysis and Sigma Xi, honorary science fraternity. He is a registered professional engineer in the State of Ohio.

New Hercules Diesels

Two new high-speed six cylinder diesel engines designed for applications in which speeds of 1800 to 3000 rpm are desired have been introduced by Hercules Motors Corp. The new DDH engines are offered in two sizes with 298 and 339 cu. in. displacement. The former providing up to 112 hp at 3000 rpm, and the latter 122 hp at 3000 rpm. These engines were developed primarily for marine use and for use in modern road and highway service equipment, particularly equipment using hydraulic torque converters which call for engine



speeds of approximately 2200 rpm for efficient operation. They are also useful in any other applications where a premium is placed on less engine weight per unit of horsepower and higher power output for the same size engine. Principle new design features distinguishing the new engines from Hercules' regular DD diesel line are increased crankpin diameter (2½ in. as compared with 2 in.) and larger main bearing diameter (2⅞ in. as against 2½ in.). The DD line is designed for operation at speeds up to 1800 rpm. Further information may be obtained by writing Hercules Motors Corp., Canton, Ohio. **ITS NEW**

Self-Propelled Machine Shop Barges

Korody Marine Corp. has announced the completion and delivery of four 66 ft. machine shop barges to the Amazon area for one of the largest oil companies in South America. These vessels were specially designed by Korody and are to be used as floating bases for the maintenance and repair of oil drilling rigs and oil well pumps. These modern barges have a 14 ft., 3 in. beam

and a shallow draft of only 2 ft., 6 in., with a displacement of approximately 45 tons. Self-propelled, these craft are autonomous, capable of remaining away from supply bases for long periods of time. Large oil tanks provide exceptional range and modern deep freeze installations permit storage of substantial quantities of food. Accommodations for six men are provided. Machine tools include a large lathe, milling machine, drill press, welding equipment and air compressor. Large pieces of machinery and parts are handled by a boom and winch of two ton capacity. Propelled by a General Motors series 4-71 diesel engine, the barge can obtain speed up to 10 mph. The same engine drives a 25 kw 220 volt generator which provides power for the operation of the machinery on board. The barges were built in



an Italian shipyard associated with Korody's Italian subsidiary, Navaltecnica Internazionale, S.p.A., in the Livorno area. Extensive preliminary engineering made possible the loading of all four barges on the liberty ship *Stromboli* which delivered them to South America.

FRAM FULL-FILTRATION MEANS FULL PROTECTION FOR YOUR DIESELS



**FRAM WATER SEPARATOR AND
FUEL FILTER TRAPS DIRT AND DUST,
REMOVES ALL WATER.**

Here's protection that pays off in performance. 100% efficiency in removing water that pits and corrodes injectors. Dirt and dust are trapped, rust and contaminants eliminated for good.

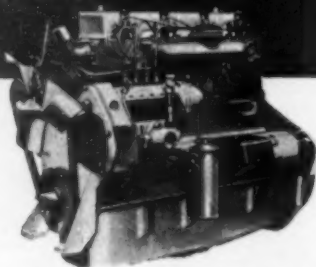
Reduce down time, save on maintenance . . . keep your Diesels working full time with FRAM Full-Filtration.

For complete details on FRAM Diesel Filter applications write: FRAM Corporation, Providence 16, R. I. or FRAM Canada Ltd., Stratford, Ontario.

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OIL • AIR • FUEL • WATER
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can help you
sell more
equipment on
a world-wide
scale!



450,000 Perkins diesel engines are now in use in 163 countries of the world—in 450 applications.

F. Perkins Ltd. have sales, service and parts outlets in 106 countries. Versatile Perkins engines are available to the specifications of your engineering department, anywhere in the world.

This means you can have your equipment shipped anywhere in the world—without motors—at less cost to you and your distributor. Your customer can then readily install a Perkins diesel package, tailored to your application and approved by your engineering department, at destination point. This would also reduce the dollar cost of the equipment, important to customers in the non dollar area.

Perkins maintain an engineering staff in Toronto, Canada. Phone them—they will fly down and discuss applications with you. Prototype installations can be made at Toronto or at your plant.

Cut shipping costs and assembly problems... call or write Perkins' Toronto office.

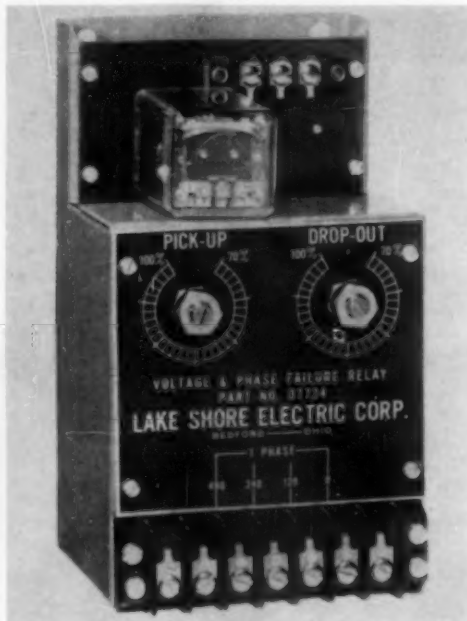


Perkins

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Distributors in Canada from coast to coast. 5716

Differential Voltage Sensing Relay

A differential voltage sensing relay developed recently by the Lake Shore Electric Corp. employs a simple printed circuit with a standard plug-in



SPDT relay to open and close circuits. A zener diode and transistors employed in the sensing circuit assure high sensitivity, according to the manufacturer. The plug-in relay is a stock model, said to be easily obtainable for servicing when required. It affords positive, consistent response

without chatter. The unit provides a control range of 70 to 100 percent of rated voltage for both drop-out and pick-up with a minimum one-volt differential. Very accurate settings are obtained by using variable potentiometers for pick-up and drop-out control. These are calibrated for adjusting convenience between 70 to 100 percent. The unit is said to protect, in addition to power and lighting systems, industrial motors, machine tools, and process equipment. In electronic applications, the differential relay may be employed to protect radar gear, microwave relay systems and other applications such as missile control stations where varying voltage factors are undesirable. The relay is designed for DC service of both 6 to 49 volts, and 50 to 250 volts. The AC service range includes both single phase and three phase, 3 wire and 4 wire. Standard AC relays are available in open models or with NEMA type-2 closures. Further information may be obtained from the Lake Shore Electric Corp., 205 Willis St., Bedford, Ohio.

ITS NEW

Twin Disc Marine Gear Announced

Twin Disc Clutch Co. has announced production of the Twin Disc MG-512 marine reverse and reduction gear, a redesigned, heavier version of their model MG-511. The model MG-511 was introduced 3½ years ago, and has met with outstanding success. The service history of the MG-511 has surpassed all expectations, making it one of the most widely accepted of all Twin Disc marine gears. This has lead Twin Disc to redesign this gear to

new answers to these DIESEL PROBLEMS

EXHAUST VIBRATION
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This new fact-filled brochure gives latest Engineering Data on corrugated steel and stainless steel Diesel exhaust and air intake lines... installation diagrams and tables plus analyses of Diesel engine pipeline problems... how Allied's 10-X and 21-X overcome vibration, expansion and contraction, misalignment, engine pulsations, offset.

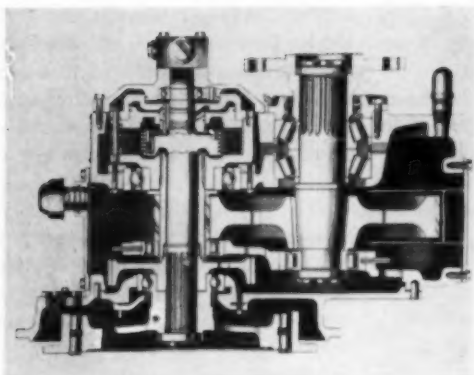
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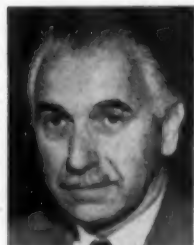




permit its application to new, larger engines. Basic changes incorporated in the model-512 include the addition of a second row of rubber blocks to the driving ring and enlargement of the input shaft bearing. Advantages of the MG-511 are retained in the model-512. These advantages are: smooth one second shift; clutches can be removed for servicing without pulling gear from engine; flywheel housing remains dry, with no problem of oil transfer or leakage; double countershaft seals eliminate oil leakage out or bilge leakage in; and mechanical come-home feature permits forward rotation even if hydraulic system is rendered inoperative. For further information, write Twin Disc Clutch Co., Racine, Wis.

(ITS NEW)

New Engineering Assignments



Dr. E. A. Horiak

Four key engineers of Hercules Motors Corp. have been assigned new management responsibilities in a move designed to reflect the broadened scope of Hercules engineering. William L. Pringle, president, has announced. Dr. Erwin A. Horiak, chief engineer since 1954, has been named director of engineering. Dr. Horiak joined Hercules as a research engineer in 1935; he became chief engineer of the diesel division in 1943. Earlier he had spent six years as a research engineer of Daimler-Benz in Germany and two years as director of research for J. & H. McLaren in England. A native of Yugoslavia, he holds a degree of Doctor of Technical Sciences from the Institute of Technology, University of Vienna.

Assisting Dr. Horiak, who will have the responsibility of carrying out the company's entire engineering program, will be J. L. Biasetti, chief engineer; Harry Cuthbert, chief engineer-advanced engineering, who will be in charge of all new product development work; and Robert E. Kerr, in charge of all experimental laboratory activities.

HERE IS IMPORTANT INFORMATION! The completely new 1958 edition of the **DIESEL ENGINE CATALOG**, Volume 23, is now available. If you design, purchase, sell, operate or service diesel, dual fuel or gas engines, the Catalog is essential to you. This giant, 400 page, 10½" x 13½", fully illustrated reference book has been revised, rewritten and brought up to date completely from cover to cover. Send your order in now for this limited edition, which costs \$10 postpaid plus California sales tax where applicable. Send checks or company orders to **DIESEL ENGINE CATALOG**, 816 N. La Cienega Blvd., Los Angeles 46, Calif.

DECEMBER 1958



Jim Miller, Shepherd Machinery Co.'s General Service Manager, administers one of the country's largest and most modern heavy equipment repair facilities.

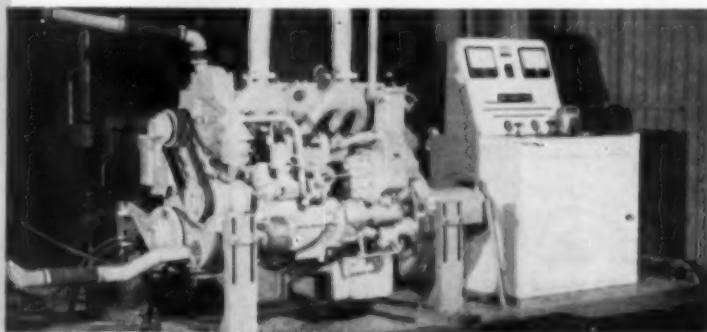
SHEPHERD MACHINERY SAYS:
"With our Clayton Dynamometer
we deliver better engine performance...
happier customer service—
at greater profit!"

Keeping customers happy and coming back to the same place to do business is essential to Jim Miller, General Service Manager of the Shepherd Machinery Company, located in Los Angeles... one of the nation's largest dealers in construction machinery, industrial and marine engines.

"With our Clayton Engine Dynamometer—which we purchased in June 1953—we are certain that we're making available to our customers the highest possible standards of service, and at a profit to us.

"A Dynamometer offers many advantages," states Jim Miller, "but most important to us has been the ability to run-in and accurately test all rebuilt engines... This has practically eliminated costly warranty field service trips and, of course, vastly improved customer confidence in our workmanship... This alone means thousands of dollars a year to any engine distributor."

Let a Clayton representative show you how a Clayton Dynamometer will pay for itself out of savings alone.



FEATURES OF CLAYTON DYNAMOMETERS

- Designed and built for "running-in" rebuilt gasoline and diesel engines.
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- Torque loads are maintained indefinitely or changed at will to fully test any engine.
- Engine adjustments on the stand are simple to make.
- All models handle either right or left hand rotation.

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OUR BUSINESS IS _____ We handle _____ engine repair jobs a week.

Send to: **Clayton MANUFACTURING COMPANY**
 443 NORTH TEMPLE CITY BLVD., EL MONTE, CALIFORNIA

Southwest Diesel

Notes

By Don Taylor

THREE new diesels with a total of 1070 hp were purchased from Cummins Sales & Services, Inc. of Houston by J. P. Petkas Drilling Co. also of Houston,

to repower drilling equipment. One engine, a VT-12-IP Cummins diesel will be mounted on an Ideco Mudmaster pump (the clutch is an SP-218, twin disc air-actuated type). A second Cummins engine—a 220 hp NH-6-IP—will replace a 150 hp unit on an EMSCO pump. The third, a 250 hp LI-600 will be installed on a Unit U-15 drilling rig to make it all-Cummins powered.

MIZELL Construction & Truck Line, Inc. of Liberty, Tex. repowered three B-60 Mack trucks with JT-6-B Cummins diesels that develop 175 hp at 2500 rpm. The trucks are used in tough oilfield hauling and construction. Engine supplier—Cummins Sales & Service, Inc. of Houston.

NEW power for a shovel—Houston Shell

& Concrete Co. of Houston installed a 150 hp Cummins HBID-600 diesel on a 2000 Manitowoc shovel used in loading and unloading sand and shell at one of the company's plants. Cummins Sales & Service, Inc. of Houston supplied the engine.

PARKER Bros. Co. of Houston is installing a Cummins HRS-6-IP diesel (240 hp) in a 12 in. shell dredge that will be used in Galveston Bay area to supply oyster shell for the company's operations. The new engine was supplied by Cummins Sales & Service, Inc. of Houston.

TODD Shipyards, Galveston Division purchased two Cummins engines from Cummins Sales & Service, Inc. of Houston. The first is a 220 hp (at 1800 rpm) model HIS-600 which will be used as a spare power supply for one of the company's large gantry cranes. The other is a 575 hp model VT-12-I diesel direct connected with a 250 kw generator in a 40-ton diesel-electric gantry crane.

SOUTHWEST Seafoods, Port Isabel, Tex. has installed a 240 hp Cummins marine engine model NHRS-6-M in the 67 ft. long shrimper, *Kathy Jeane*. This engine which was supplied by Cummins Sales & Service, Inc. of Houston has a Capitol HYC-EC-770 gear—(3.88 to 1 ratio) on the drive shaft of a 46 by 38 in. propeller.

POWER for Bolivia-bound trucks—Tennessee Gas Transmission Co. of Houston has purchased five International Harvester Co. R-210 four wheel drive trucks with JT-6-B Cummins engines supplied by Cummins Sales & Service, Inc. of Houston. The 175 hp trucks will be exported to Bolivia, South America for T G T's oilfield operations in the jungles.

SOUTHERN Engine & Pump Co. of Houston purchased a HRC-4-IP Cummins diesel to power a 30 kw generator. The engine will be used on a pile-driver. Supplier: Cummins Sales & Service, Inc. of Houston.

BAASH-Ross Division of Joy Manufacturing Co. is repowering a vehicle with a GM series 71, 5 cylinder model 3045C, 80 hp engine purchased from Stewart & Stevenson Services, Inc. of Houston, Tex.

COMMERCIAL Engineering Co. of Bellaire, Tex. purchased a G M Series 71, 2 cylinder closed type model 3031C 50 hp engine from Stewart & Stevenson Services, Inc. for use on a U.S. Navy project.

JACK Anderson Engine Co. of Kilgore, Tex. took delivery on a GM Series 71,



Weather 35° below zero does not impede the efficiency of these six AAF Type W Cycoils at Taylor, B. C. They provide clean air for the six 2000-hp compressors at Westcoast Transmission Co. Ltd.'s Compressor Station #1.

COLD...but CLEAN...CYCOIL air helps power Canada's Big Inch

Westcoast Transmission Co., Ltd.'s Compressor Station #1—initiating station of Canada's new seven-station, 17-compressor, 52,500-hp Big Inch Line—is the northernmost complex of its kind in the western hemisphere. Here British Columbia "sour" gas is "sweetened", compressed, and started on its journey toward the U. S. border, more than 750 miles away.

Despite bitter cold, AAF Type W Cycoil oil-bath intake air filters efficiently and uninterruptedly provide clean air for the safe operation

of six 2000-hp gas engines. The only concession to the cold—which sometimes reaches 50 below zero—is the use of Arctic-type oil!

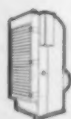
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BETTER AIR IS OUR BUSINESS

four cylinder closed type diesel propulsion unit, model 4031C-110 hp from Stewart & Stevenson Services Inc. of Houston.

35-TON locomotive used in the mining industry has been repowered with two 165 hp Cummins HRI-600 diesel engines that turn up at 1800 rpm. Owner is Uvalde Rock & Asphalt Co. of Blewett, Tex.; seller is Cummins Sales & Service Inc. of San Antonio, Tex.

WESTERN Machinery Co. of Clovis, N. M. is repowering a Case tractor with a GM Series 71, 3 cylinder diesel, model 3045C purchased from Stewart & Stevenson, Services, Inc. of Houston.

REFURBISHING a cotton gin for the fall and winter season, the Lone Oak, (Tex.) Co-operative Gin Association installed a 300 hp GM series 110 6 cylinder model 62406 diesel purchased from Stewart & Stevenson Services, Inc.

CHRYSLER Missile Division of Chrysler Corp. of Detroit has taken delivery on two Stewart & Stevenson Services Inc. special 45 kw, 400 cycle generator sets. Power—GM Series 71 3030C diesels.

TO keep pace with its present steady growth and to prepare for expected future expansion, Cummins Sales & Service, Inc., Fort Worth, has moved into larger offices and is remodeling and adding to several of its factory-type shops. The new office in Fort Worth is larger than the old one by 1,000 sq. ft. and there is parking for visitors and employees.

Goulds Pump Brochure

Bulletin 721.6 describing its line of single stage double suction centrifugal pumps with horizontally split cases has just been issued by Goulds Pumps, Inc. Fig. 3405 pumps have been available with grease lubricated bearings in 33 sizes with capacities from 200-6400 gpm and heads to 425 ft. Now, this line of pumps, designated Fig. 3406, is available in all sizes with oil lubricated bearings. In addition to the wide range of capacities and pressures, a high degree of standardization and interchangeability of parts distinguishes these pumps. This means minimum inventory of spare parts, flexibility of changes in the field to meet new requirements and low initial cost. This 16 page bulletin includes a general description of the pumps, specifications, sectional views, charts showing materials of construction parts list and parts interchangeability, construction details, mechanical data, performance curves and dimensional data. For a copy of Bulletin 721.6, write to Goulds Pumps, Inc., 47 Black Brook Road, Seneca Falls, N.Y. **(ITS NEW)**

Canadian Ferry with B&W Alpha Engines

A new ferry has been put in service across the estuary of the Canadian river Saguenay—a tributary of the St. Lawrence river, about 150 miles east of Quebec City. It is the first ferry in Canada to be equipped with B&W Alpha diesel engines. Named *Saguenay*; it has a length of 150 ft. and a beam of 37 ft. at main deck level. As it is to do shuttle service, and will not turn round during its trip, the ferry is equipped with propellers at both ends. The ferry is equipped with two 4 cylinder B&W Alpha engines of the type 400-VO with controllable pitch propellers. The two engines are arranged in continuation of each other, each developing 235 bhp at 365 rpm. The whole engine plant can be controlled from the bridge, the controls for governor and clutch as well as for the propeller pitch having been extended to the bridge. To facilitate shuttle service, the arrangement allows both engines to be controlled from either end of the bridge. Service speed of the ferry is 10 knots, and the crossing takes about 10 minutes.

Elliott Appoints Fox

The appointment of R. W. Fox as central region manager with offices in Cleveland is announced by the Elliott Co. For 17 years the Cleveland district manager, he received his B.S. in mechanical engineering from Penn State in 1922. His first assignment was in the New York office; he then moved to Cleveland as field engineer in 1924, and he established a sub-district office in Rochester in 1929. M. C. Seeman succeeds R. W. Fox as Cleveland district manager. After three years' service in the United States Navy, he was discharged with the rank of lieutenant, junior grade. An electrical and mechanical graduate of Carnegie Tech and Yale, Seeman joined Elliott in 1947 and worked in the heat transfer department. He went to Cleveland as field engineer in 1948, and he was appointed assistant district manager in 1953.

Remote Control Slave Unit

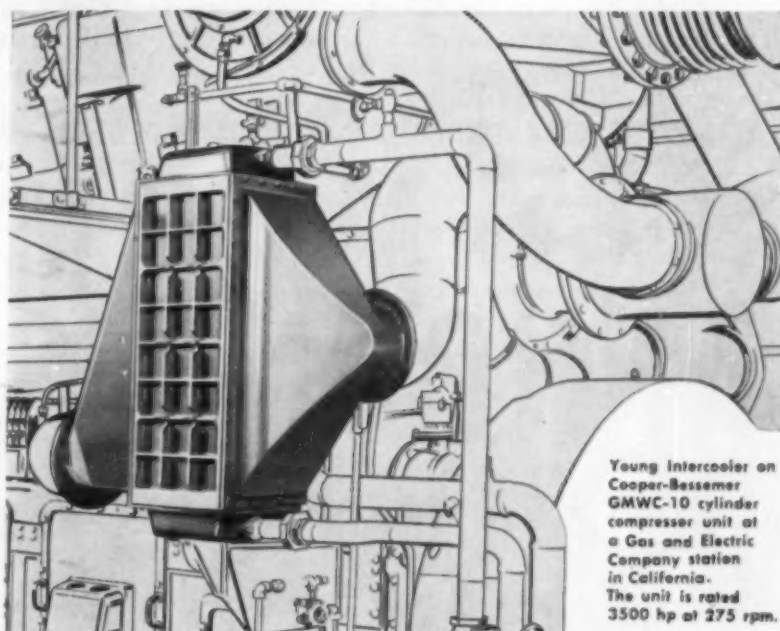
A new, straight-line, slave unit is being produced by The Hydronic Co., manufacturers of positive hydraulic remote control units. The body of the new slave unit measures 2½ in. high and 1½ in. wide. Overall length of the piston is 3¾ in. Length of stroke is one inch with a thrust capacity of up to 1,000 lbs. The new slave unit can be mounted in any position and readily connected to governors, throttles, valves, equalizers, clutches and similar devices for remote control or positioning purposes. The entire remote control system

is self-contained and completely hydraulic. The slave piston and master control lever maintain synchronization at all times. An integral filler-bleeder fitting eliminates the need for accessory pressure equipment. Filling is easy and clean. Simple adjustment of equalizer valves permits relative positioning of master lever and slave piston when filling and bleeding have been completed.

The master unit automatically compensates for expansion and contraction of fluid due to temperature variations. No pressure-actuated or spring-loaded valves are utilized. The system is unaffected by vibration and provides smooth, positive movement duplication under adverse conditions. For further information write The Hydronic Co., 12685 Arnold Ave., Detroit 39, Mich. **(ITS NEW)**

Young INTERCOOLERS

help get maximum efficiency from turbocharged engines



Young intercooler on Cooper-Bessemer GMWC-10 cylinder compressor unit at a Gas and Electric Company station in California. The unit is rated 3500 hp at 275 rpm.

Young engineering pays off with more power, more efficiency

Here is another specific example where quality and dependability count . . . Young gets the job. Many manufacturers in the Diesel industry look to Young Creative Heat Transfer Specialists for the product-answers to cooling problems. High and low pressure intercoolers by Young are used on stationary engines, marine engines, locomotives, oil pumping stations and natural gas compressors throughout the world. Young quality starts at the design of the intercooler cores themselves—laboratory tested and scientifically designed to furnish the maximum heat transfer with a minimum restriction of air flow. Intercoolers are only one of the many Heat Transfer products produced by Young. Why not put Young engineering to work for you—and solve your heat transfer problems now.

Write Dept. 408-M for Catalog 1652

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Creative **HEAT TRANSFER ENGINEERS**

Executive Office: Racine, Wisconsin, Plants at Racine, Wisconsin, Matteson, Illinois

Michigan-Ohio News

By Jim Brown

JOHN Cross of Charlevoix, Mich. has accepted delivery on a new NH-6-M Cummins marine engine for his new unnamed fishing tug. Built by T. D. Vinette Co. of Escanaba, Mich., her dimensions are 52 ft. length, 14 ft. beam and a 4 ft. draft. The engine was sold by Cummins Diesel Michigan, Inc. and was delivered with Twin Disc model MG 165 3 to 1 reverse and reduction gears.

TERRY N & Saya of Scottsville, Mich. has accepted delivery on an Allis-Chalmers model HD6E crawler equipped with hydraulic blade. The sale was made by Earle Equipment Co. of Detroit.

THE appointment of Win MacPhail as sales representative for Construction Equipment Co., 21720 West Eight Mile, Detroit, has been announced. Win will

service west central Detroit and Oakland County. Born in Ottawa, Canada, MacPhail attended Ottawa Technical school. Before joining Construction Equipment Co. he was field representative for one of the major air compressor and air tool manufacturers.

WILLIAM J. Muehlenbeck & Co. of Saginaw, Mich. has accepted delivery on a new TD-24 International crawler equipped with hydraulic dozer blade. The crawler was purchased from Wolverine Tractor and Equipment Co. and will be broken in on a road job near Muskegon, Mich.

NORTHWEST model 6 Pull-Shovel with a 1 1/4 yd. capacity was recently delivered to George Tripp of Pontiac for general excavation. The new Northwest is powered by a Murphy model 20 diesel and was sold by Cyril J. Burke, Inc. of Detroit.

AN Adams model 550 grader equipped

with a GM 4-71 Detroit diesel engine was recently delivered to Mahogany Equipment Co. of Ann Arbor, Mich. The sale was made by Telford Equipment Co. of Detroit.

P. & H. 755 dragline crane (1 1/4 yd. cap.) has been sold to Harold Dean & Son of Mt. Clemens, Mich. The crane was purchased from J. R. Panelli Equipment Co. of Detroit.

CUMMINS Diesel of Northern Ohio, Inc. (Cleveland, Ohio) has installed a model NH-220-BI Cummins diesel in a model DC Autocar for the Tri Mix Stone Corp., of Cleveland.

MODEL TL-12 Tracto Motive Loader with a backhoe attachment was recently purchased from Earle Equipment Co. by the City of Flint. With this unit the City of Flint is using a new process in their "street" work . . . they can now hoe and load trucks in one operation.

APPOINTMENT of Tom Cooper as its midwest district representative for road machinery has been announced by Bros, Incorporated. Cooper's experience, prior to joining Bros, includes service with Virbo-Plus Products, Inc., Dixie Crane & Shovel Co., and Knight Equipment Co., a Virginia distributor. He is a graduate mechanical engineer from North Carolina State College.

ROBERT Gilliland of Alpena, Mich. has purchased a Bucyrus-Erie model 22B dragline for excavating on a road project near Alma, Mich. The new Bucyrus-Erie crane was sold by Wolverine Tractor and Equipment Co. of Detroit and Grand Rapids.

OLIVER 880 Hydro-trencher (1/2 yd. capacity) equipped with a Hercules 6-cylinder diesel engine was recently purchased by the City of Oak Park, Mich. Sale was made by Cyril J. Burke, Inc. of Detroit.

GENERAL Motors model 3030-C Detroit diesel engine was recently installed in a Bucyrus-Erie 22-B shovel by Peninsular Diesel Inc. of Detroit. The installation, which replaced a gasoline engine, was done for Henry Kuebler of Ann Arbor, Mich.

J. R. PANELLI Inc. of Detroit has sold a Case model 1000 bulldozer (100 hp) to Raymond & Fenton of Memphis, Mich.

CARBON Limestone Co. of Lowellville, Ohio has a new model NHS Cummins diesel for their Whitcomb model 25DM-42-A Locomotive. The sale was made by Cummins Diesel of Northern Ohio, Inc. (Cleveland)

L. E. PIERCE Trucking and Excavating Co. of Van Dyke, Mich. has purchased an Allis-Chalmers model HD6G crawler equipped with a Tracto-Loader and a ripper. The crawler was purchased from Earle Equipment Co. of Detroit and will be used for excavation of alleys in preparation for paving.

GALION model 118 motor grader equipped with an International UD 525 diesel engine was recently sold to Berkley Asphalt Paving Co. of Berkley, Mich. Sale was made by Wolverine Tractor and Equipment Co. of Detroit and Grand Rapids.

PENINSULAR Diesel Inc. of Detroit has installed a GM 2055 Detroit Diesel engine in a model 66 Wayne Crane for the DeLong Bulldozing Co. of Muskegon, Mich.

WORTHINGTON Blue Brute model 315 rotary air compressor powered by a Cummins NHC-400 diesel engine was recently delivered to the Grand Trunk Railroad by J. R. Panelli Equipment Co. of Detroit.

JACK McGraw of Yale, Mich. has purchased a Cummins HR-6-P diesel engine for his new gravel pump. The engine was sold by Cummins Diesel Michigan Inc. of Dearborn.

CONSTRUCTION Machinery Division, Clark Equipment Co. of Jackson, Mich. is offering a full line of all-weather cabs for Michigan 1 1/4 to 6 cu. yd. tractor shovels, 162 to 600 hp tractor dozers, and 5,700 to 20,000 lb. capacity tractor loggers.

HYSTER Co. has announced a new DW20A grid compacter, a self-propelled machine designed to match compaction yardage with the spreading capacity of earthmoving machines. Steel slab ballast for the prime mover and towed unit plus sand in wheel cones gives wheel reactions of 30,800 lbs. for prime mover rear wheels and 32,300 lbs. for towed unit wheels. The DW20A compacter consists of a Cat DW20 tractor prime mover with two grid wheels mounted on driving axles, and a two-wheel grid towed unit. Grid wheels are cast alloy steel, heat treated to 300 plus Brinell.

HERE IS IMPORTANT INFORMATION! The completely new 1958 edition of the **DIESEL ENGINE CATALOG**, Volume 23, is now available. If you design, purchase, sell, operate or service diesel, dual fuel or gas engines, the Catalog is essential to you. This giant, 400 page, 10 1/2" x 13 1/2", fully illustrated reference book has been revised, rewritten and brought up to date completely from cover to cover. Send your order in now for this limited edition, which costs \$10 postpaid plus California sales tax where applicable. Send checks or company orders to **DIESEL ENGINE CATALOG**, 816 N. La Cienega Blvd., Los Angeles 46, Calif.

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Now it is more financially practical than ever before to ventilate as well as silence engine rooms. Maxim research has reduced the cost — while improving the efficiency — of air-jacketed silencers.

Maxim Air-Jacketed Silencers offer you a low cost "package" that combines noise suppression and ventilation . . . that avoids accidental burnings . . . that lasts years longer than conventional silencers and with less maintenance.

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Subsidiary of Emhart Mfg. Co.
94 Homestead Ave., Hartford, Conn.

Compact Spark Arrestor

A compact spark arrestor that approximates the size and shape of a muffler is now ready for forklifts, tugs, pickups, loaders, and the smaller tractors, trucks, harvesters and stationary engines, according to the manufacturer. This new type of Gill spark arrestor uses a straight-through exhaust-flow-principle and a new cyclonic action that is almost 100 per cent efficient in trapping dangerous incandescent exhaust carbon. The arrestor is highly efficient at all throttle ranges. Its back-pressure is very low. Having both inlet and outlet fittings, it can be placed at the end of, or within the exhaust system, and mounted horizontally, vertically, inverted or at any angle. In most applications it can replace the muffler and can occupy that same space. This type C Gill spark arrestor is made in sizes to accommodate both gas and diesel engines up to 325 cu. in. displacement. Exhaust carbon is retained within the arrestor and dumped periodically through an easily accessible port. Write to the manufacturer: Erickson Products Co., 1960 Carroll Ave., San Francisco 24, Calif. for further information.

(ITS NEW)

Chemical Treatment for Pistons

A rotary type machine designed and built by Ransohoff, Inc. puts chemical wear reducing treatment for diesel engine pistons on an automatic basis. Valuable floor space savings are effected since this machine is only 8 ft. in dia. and 5 ft. high. Time savings are realized in the processing cycle by the positive action of the pre-set time switch. Only one operator is required for loading and unloading the diesel pistons. Operation of this machine is extremely simple. Pistons loaded on fixtures are automatically processed one every 4 minutes, or a total of 15 pistons/hr. The machine is ruggedly constructed for long life and designed for trouble-free operation. The wear reducing chemical tank is stainless steel and the other tanks are mild steel. Tanks are heated by steam plate coils and can be built for heating by gas or electricity. In addition to this rotary type chemical treatment machine for diesel pistons, Ransohoff designs and builds cabinet, drum, conveyor and monorail type machines for cleaning and processing other diesel engine parts at overhaul facilities. Automatic loaders and unloaders can be provided with all

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types to effect additional important savings. Details may be obtained by writing directly to the manufacturer: Ransohoff, Inc., North Fifth St. and Ford Blvd., Hamilton, Ohio.

(ITS NEW)

De Laval Subsidiary

Formation of a wholly-owned international subsidiary company under the name of Compania De Laval Turbina

Internacional, S. A., has been announced by De Laval Steam Turbine Co. The main office of the new company will be in Panama, R. de P. The new company will coordinate and promote the sale and servicing of De Laval products throughout the world, except the United States, Canada, Hawaii and Puerto Rico. These products include steam turbines, centrifugal compressors, centrifugal and

rotary pumps, all kinds of gearing including worm gear and marine equipment. Mr. Richard Cahill, of Panama, is president of the new corporation. De Laval also announced the formation of De Laval Turbina de Mexico, S. A., a subsidiary of the Panamanian company, with headquarters in Mexico City, D. F. J. P. Stewart, of Trenton, is president and Richard M. Cueto is sales manager.

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- Sure, split-second starting—even in sub-zero weather
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Here's a proved cranking system that spins engines 2 to 3 times faster—in torrid heat or freezing cold. It's the American Bosch HYDROTOR—the hydraulic cranking system that puts real muscle into engine cranking—eliminates battery and starter troubles, reduces down-time expense—saves you real money on maintenance and repairs. You'll want to learn more about HYDROTOR—the

revolutionary system that uses oil under high pressure to crank diesel or gasoline engines *faster with greater power*. You'll want the outstanding performance and dependability—the economy of HYDROTOR for your engines. Send today for free brochure H110-02-2 and the name of your nearest Hydrotor distributor. American Bosch Division, American Bosch Arma Corporation, Springfield, Mass.

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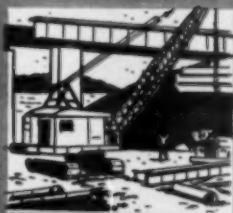
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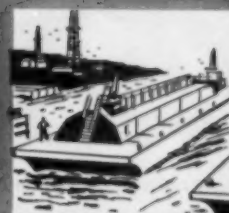
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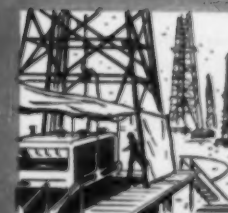
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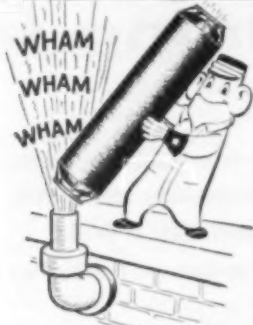
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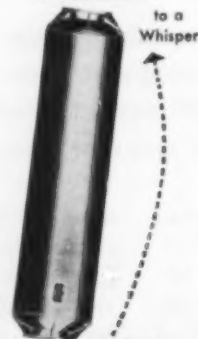
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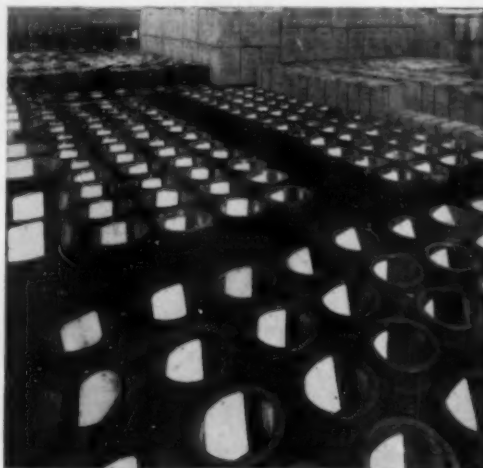
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Most "old timers" among liners in service today are Mecrome plated liners! Our unique plating process increases liner life by evenly distributing the pockets that retain the lubricating oil throughout the chromium-plated liner surface. This creates a strong bearing surface, without hard or soft spots and results in long engine life, rapid "break-in" cycles and superior lubrication. Send us a trial order today!



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Explosion-Proof Pressure Control

United Electric Controls Co. is announcing a new, explosion-proof pressure control for air, gas or liquid pressures. This compact unit is especially designed for use in hazardous locations where explosive vapors or gases are present. Calibrated pressure settings are made by simply rotating a single turn adjustment knob and pointer against a fixed, easily-read calibrated dial. There are 22 models available in a variety of adjustable ranges between 0 and 500 psi with capabilities of reaching 600 psi in the stainless steel models without appreciably affecting performance. The bellows of these units come in the following materials: phosphor bronze, brass, monel and stainless steel. In the seven stainless steel models, the pressure connection can be replaced by lower priced brass if corrosion is not a factor. The H95 is available in any one of three standard types of switches: normally open, normally closed, or double throw. The normally closed type is unique in that it will open on rising pressure. All switches are single pole and suitable for ambient temperatures up to 180°F. They are standardly rated for 15 amps at 115 or 230 volts ac. For additional information write to United Electric Controls Co., 79 School Street, Watertown, Mass.

Prof. Baier To Serve Fairbanks-Morse

Prof. Lewis A. Baier, retired chairman of the University of Michigan's department of naval architecture and marine engineering, has been retained as consulting naval architect to Fairbanks, Morse & Co., it was announced by V. H. Peterson, Vice President-Sales. Prof. Baier is the author of, *The Navigators Handbook*. He is a member of the Society of Naval Architects and Marine Engineers, Institution of Naval Architecture in London, Great Lakes Research Institute, and other professional organizations. According to *Who's Who in America*, Professor Baier graduated from the University of Michigan as Bachelor of Marine Engineering in 1914 and has been a Naval Architect since 1935. Prof. Baier will work with the Marine Engineering Division at the Fairbanks-Morse Beloit works.

New Eastern Manager for Koppers

Mr. Harry P. Neher, Jr., sales manager of the Metal Products Division, Koppers Company, Inc., has announced the appointment of Earl L. Wilson, Jr. as manager of the Division's eastern district, effective immediately. Prior to his latest promotion, Wilson was sales manager of Koppers Box Machinery De-

partment at Glenarm, Md. Mr. Wilson graduated from Yale Univ. in 1951 with a degree in mechanical engineering. He joined the New Departure Division of General Motors Corp. shortly thereafter and served in various assignments as junior sales engineer, sales engineer and zone sales manager. In 1955 he was named sales manager of the Hydraulic Transmission Division, Gerotor May Corp. and became associated with Koppers a year later. In his new position, Mr. Wilson will direct the Division's sales activities in eastern New York state, northern New Jersey and New England. He will make his headquarters at the Company's district office at 430 Park Avenue, New York, N. Y.

Diesels Climb Mountains

The first Telecar system ever installed in the U. S. is carrying passengers to the top of 6,800 ft. Wildcat Mountain, New Hampshire. A Cummins NVH-12-IP engine furnishes power for the lift system. The unique skier and sight-seer lift features 96 gondola-type cars which transport 600 persons/hr. to the top of the mountain. A passenger can be whisked to the top in 10 minutes. This unusual mountain-top application posed several installation problems. The engine was hauled to the mountain top on a wooden sled—an operation which took three days. At the top the engine was placed inside a steel building and positioned twenty feet off the floor on a steel frame. The engine installation was made by Cummins Diesel of New England, Inc. The NVH-12-IP powering the lift is rated at 425 hp at 2100 rpm.

Oakite Promotes Seib and Steif

Mr. George M. Seib, formerly secretary of Oakite Products, Inc., has been appointed vice president of the company, which manufactures industrial cleaning and metal treating compounds. Erwin H. Steif, who was Mr. Seib's assistant, has been promoted to the post of secretary. With Oakite since 1922, Mr. Seib has been a member of the board of directors since 1946, and has served as secretary since 1953. Mr. Steif, a graduate of Yale Law School, joined Oakite in 1948 as legal counsel, and has served on the board of directors since 1953.

HERE IS IMPORTANT INFORMATION!

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360 HP Turbopower Unit

The Detroit Diesel Engine Division of General Motors has developed a 360 hp diesel which adds a new high to the horsepower range of GM Diesel's line of single engines for industrial applications. The new engine, announced by Robert E. Hunter, general sales manager, is a series 110 model in which a 20 per cent gain in horsepower is attained through turbocharging. According to Hunter the increase in horsepower from 300 to 360 is attained with no appreciable increase in bulk, weight or fuel consumption. An exhaust driven turbine driving an air impeller works with the engine blower to increase the fresh air supply to the cylinder. The result is improved combustion, greater efficiency and better high altitude performance. Available with base and radiator as well as a fan-to-flywheel unit, the new 6-110T has been developed for contractors' equipment and other portable and stationary industrial applications requiring a comparatively small, light-weight unit of high power output.

Three Way Valve

New 9300 series 3-way plug valve featuring leakproof shutoff and preventing external and body leakage is now available from Circle Seal Products Co. Unique design also permits the valve to provide minimum pressure drop. Use of a unique sealing principle with "O" rings on the face of a cylindrical plug and on the diameter of the plug produces effort-free operation and maintenance-free service life without adjustment. The new general purpose valve for both gas and liquid circuits has three ports arranged as 3-way valves to provide one inlet, one outlet and an exhaust either piped or atmosphere. The new 9300 valve provides either one inlet and two outlets or two inlets and one outlet when functioning as a selector valve. Typical applications for the new valve include test benches, pilot and process plants, pneumatic and hydraulic equipment and plant air circuits. An illustrated data sheet showing the operation of the 9300 valve and details such as its operating temperatures of -40 to 250 degrees F and operating pressures of -14.7 to 150 psi is available free from Circle Seal Products Co., 2181 East Foothill Blvd., Pasadena, Calif.

ITS NEW

Power Conference Scheduled

The 21st American Power Conference, sponsored annually by Illinois Institute of Technology in cooperation with a group of technical societies and educational institutions, will be held on March 31 and April 1-2 at the Hotel Sherman, Chicago. The conference, which is attended each year by more

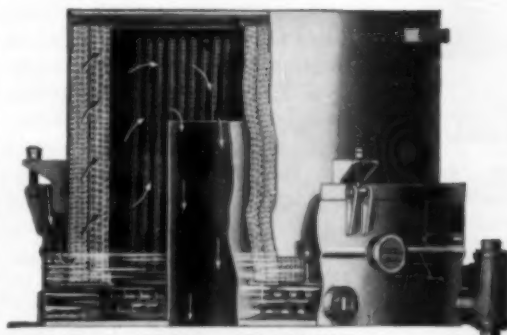
than 3,000 industrial and electric utility executives, engineers, educators, and government officials, provides a forum for discussion of problems and exchange of information concerning the electric power industry and associated activities. The cooperating colleges and universities are Illinois, Iowa, Iowa State, Michigan, Michigan State, Northwestern, Purdue, Minnesota, Wisconsin,

Texas A. & M., New York, California Institute of Technology, Georgia Institute of Technology, and Massachusetts Institute of Technology. The societies are American Institute of Chemical Engineers, American Institute of Electrical Engineers, American Institute of Mining, Metallurgical and Petroleum Engineers, American Society of Civil Engineers, American Society of Heating and

Air Conditioning Engineers, American Society of Mechanical Engineers, National Association of Power Engineers, Western Society of Engineers, and Engineers' Society of Milwaukee. Inquiries concerning the conference should be sent to Conference Director R. A. Budenholzer, Mechanical Engineering Department, Illinois Institute of Technology, 3300 Federal St., Chicago 16.

longer life for your locomotive diesels

with cleaner intake air
from AIR-MAZE
oil bath or panelbath filters



Air-Maze Oil Bath Filter
for efficient filtration at low maintenance expense.



Air-Maze Panelbath Filter
for effective filtration at low initial cost.

Which should you use? One or both of these Air-Maze filters has the economic answer to your locomotive requirements. Evaluate the advantage of each filter under your operating conditions.

OIL BATH FILTER—Removes 92% or more of all objectionable dirt...has exceptionally high dirt-holding capacity...requires only semi-annual or annual oil changes and bowl deposit removal.

PANELBATH FILTER—Built to up-grade panel filtration of intake air, the PANELBATH has low initial cost...replaces 2" and 4" oil-wetted or centrifugal panels on engine air intakes. Requires only periodic servicing at 90-day intervals under normal operating conditions.

Replaces panel filtration with resultant efficiency at least equal to that replaced.

The principle of the oil bath used in both these Air-Maze filters is backed by successful service on over 4000 locomotives.

For further information, contact your locomotive builder or write Air-Maze Corporation, Cleveland 28, Ohio.



The biggest names in diesels
are protected by Air-Maze filters

AIR-MAZE
The Filter Engineers

ENGINE AIR FILTERS • CAR BODY FILTERS • LUBE OIL FILTERS • OIL SEPARATORS • PASSENGER CAR FILTERS

New Flow Switch Folder

A dependable, moderately-priced approach to many problems involving automatic controls or safety devices is described in a new bulletin published by McDonnell & Miller, Inc. This new Bulletin FS-1 covers the McDonnell line of flow switches—devices which respond to flow of liquid in a pipeline to make

or break an electrical circuit. As listed in this bulletin, the flow switches have an extremely wide range of application. They can be used to light signals, sound alarms, start or stop motors, burners or metering devices. The bulletin introduces the new McDonnell FS4 series flow switches, suitable for pressures up to 100 lbs. Details of construction are given, along with dimensions, models

available and Underwriters' listed electrical ratings. Also covered are the McDonnell E-2 series flow switches—a completely water-proof design suitable for pressures up to 150 lbs. For a copy of this new Bulletin FS-1 write to McDonnell & Miller, Inc., 3500 N. Spaulding Ave., Chicago 18, Ill.

ITS NEW

Enterprise Promotes Blanton

Mr. Dale W. Blanton has been promoted to assistant sales manager and Robert A. Thompson has been made manager of contract engineering of the Enterprise Engine & Machinery Co., sales subsidiary of General Metals Corp. Blanton has been with Enterprise eight years. Before his promotion he was manager of contract engineering and prior to that he was employed by the Atlas Engine Co. of Oakland. Thompson, a twenty year man with Enterprise, was formerly senior contract engineer in the diesel engine sales department.

Purolator Michigan Appointments

Appointment of Eugene B. Delaney as general manager of the Wayne (Mich.) division of Purolator Products, Inc. and T. E. Coffman as branch manager of the Detroit sales office has been announced by James D. Abeles, president. Mr. Delaney is a native of Mt. Morris, Mich. A graduate of the University of Detroit, he started work in 1934 in the engineering department of the Ford Motor Co. where, during World War II, he worked on the turbo supercharger and ram jet engine projects. He joined Purolator in 1947 as Michigan-Ohio sales representative, and in 1955 was appointed branch manager of the Detroit sales office. Mr. Coffman, a native of Peru, Ind., attended the Detroit Institute of Technology and began work in 1939 with the Ford Motor Co. After military service with the Army Air Force, he worked for the United Tire Company's sales department before joining Purolator in 1952 as sales engineer.

Ramsey Corp. Names Walden

Ramsey Corporation of St. Louis, makers of Ramco Piston Rings, announced the appointment today of Kenneth T. Walden to head its Retaining Ring Division. Mr. Walden joined Ramsey in 1957 and served in various capacities in the Service Sales Division. His success during the following two years resulted in his present appointment. His new duties will include coordination of sales, advertising, sales promotion and market planning. Mr. Walden is a member of the Society of Automotive Engineers and the Harvard and Northeastern University Alumni Associations.

Elliott Promotes Lemmon

The Elliott Company of Jeannette, Penn., announces the appointment of J. R. Lemmon as eastern region manager with headquarters in Philadelphia. Mr. Lemmon has been with the Elliott Company since his graduation from college, in 1921. His first assignment was in Philadelphia; later he was appointed district manager at Baltimore, then Cincinnati, and Washington, D.C. In 1943, he came back to Philadelphia as district manager. Succeeding Mr. Lemmon as district manager of the Philadelphia office is H. D. Moll. Mr. Moll joined Elliott Company following the completion of four year's service with the United States Navy, emerging with the rank of lieutenant, senior grade. Since 1946, he has been with the Philadelphia office.

Electrical Fuel Gauge

A new electrical fuel gauge, which makes its appearance on certain new tractor models, is now being marketed by Rochester Manufacturing Co., producers of liquid level, temperature, and pressure instruments. Voltage compensated, the gauge is available for 6 and 12 volt systems. This remote indicating, electrically operated fuel level gauge is furnished singly or in panels with standard RMC oil pressure, ampere, and temperature. The fuel gauge can be used on tractors, buses, trucks, on saddle tanks for trailer trucks or on other vehicles. Underwriter approved pressure types are available for LP-Gas tractors. Write to Rochester Mfg. Co., 100 Rockwood St., Rochester 10, N.Y. for additional information.

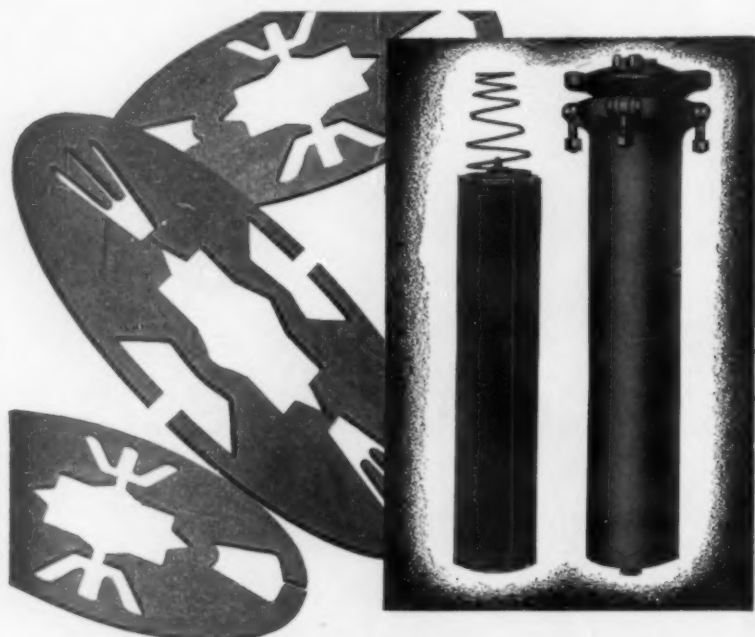
ITS NEW

Cooper-Bessemer Promotion

Promotion of Phil S. Hurst to the post of assistant product manager, gas engine compressor sales, is announced by Grant C. Woodard, general sales manager of The Cooper-Bessemer Corp. In his new capacity, Hurst will assist Don Reed, product manager, gas engine compressors. A graduate of Oklahoma State Univ., Hurst holds the degree of Bachelor of Science in Chemical Engineering. Joining Cooper-Bessemer upon graduation, he has been associated with the sales engineering section for which he has now been made assistant manager.

HERE IS IMPORTANT INFORMATION!

The completely new 1958 edition of the **DIESEL ENGINE CATALOG**, Volume 23, is now available. If you design, purchase, sell, operate or service diesel, dual fuel or gas engines, the Catalog is essential to you. This giant, 400 page, 10½" x 13½", fully illustrated reference book has been revised, rewritten and brought up to date completely from cover to cover. Send your order in now for this limited edition, which costs \$10 postpaid plus California sales tax where applicable. Send checks or company orders to **DIESEL ENGINE CATALOG**, 816 N. La Cienega Blvd., Los Angeles 46, Calif.



the NUGENT Laminated Disc Filter

This "extended area" filter utilizes an actual filtering surface area greatly in excess of its container area. The Nugent Laminated Disc Filter provides a high flow rate at low pressure drop combined with the extreme fine filtering absorption and neutralizing properties of a depth type filter.

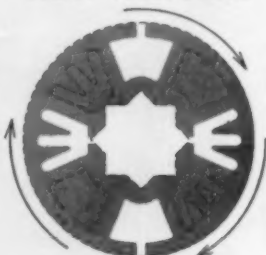
The filter charge consists of a stack of similar crenulated fiber discs, each rotated 45° from the position of the adjacent disc, thus affording proper channeling and maximum filtering capacity. Liquid passes from the exterior to the interior of the filter stack.

The filter recharge has a useful life of from 4 to 10 times that of a cellulose or waste recharge. Changing recharges requires only minutes. Cartridges are interchangeable with all other Nugent bag or depth type cartridges. Write for full details.

DESIGN FEATURES

- Provides "Extended Area" filtering
- Removes solids as small as 2 microns
- Removes acid forming contaminants
- Will not remove additives
- Contains no chemicals or bleaches
- Working pressure 125 psi—tested to 375 psi
- High pressure filters to 600 psi—tested to 3000 psi
- Built in by-pass relief
- Maximum operating temperature 375°F.

HOW IT WORKS



Each disc in filter stack is rotated 45° from position of adjacent disc for proper channeling and maximum filtering capacity.



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OIL FILTERS • STRAINERS • TELESCOPIC OILERS
OILING AND FILTERING SYSTEMS • OILING DEVICES
SIGHT FEED VALVES • FLOW INDICATORS

REPRESENTATIVES IN
PRINCIPAL CITIES

New Bristol Thermocouple

The Bristol Co. announces the Armorox thermocouple for measuring temperatures up to 2900°F at pressures up to 50,000 psi. This metal-sheathed, ceramic-insulated thermocouple is easily bent around twice its own diameter to get in-to out-of-the-way places. The sheathing is available in stainless steel and Inconel in diameters from $\frac{1}{8}$ to $\frac{1}{4}$ in. and lengths to 30 ft. Wire down to #30 AWG can be used. Thermocouples are available in Chromel-Alumel, iron-constantan, copper-constantan, and other materials. Armorox thermocouples can be used for every application of conventional pencil-type thermocouples and meet the ISA standards for accuracy. For additional information: The Bristol Co., Waterbury 20, Conn. **ITS NEW**

Gas Turbine Meeting Scheduled

The turbine in action will be the subject of a three day engineering meeting sponsored by the Gas Turbine Division of The American Society of Mechanical Engineers. Scheduled for March 8-11, 1959, in Cincinnati, Ohio, the conference also features an exhibit of the latest designs and equipment in the turbine field. Five sessions are scheduled over the three days, dealing with marine, aircraft, heat exchanger application and gas turbine component design topics. Among papers that will be presented are those on analysis of the performance of a supersonic exhaust nozzle for turbojet engines, experience with gas turbine ships, development of a three-stage liquid cooled turbine and a boost power turbine for naval propulsion. Besides the technical sessions and the exhibit, attendees will also be offered inspection trips to the General Electric Aircraft Turbine plant at Evandale and the Cincinnati Milling Machine Company.

Air-Maze Representatives

The appointment of McMurtry & Company of Miami and H. L. McMurtry & Company of Jacksonville, Florida, as sales representatives for The Air-Maze Corporation, is announced by The Air-Maze Corp., Cleveland, Ohio. The new representatives will handle the application and sale of air and liquid filters. Filters produced by Air-Maze for removal of air-borne dirt from ventilating systems range from panel filters to completely automatic, self-cleaning curtain panels. In addition there are electronic air cleaners as well as many kinds of oil-bath, oil-wetted and dry-type filter and filter-silencer units.

All Metal Filter Cartridge

Positive filtration in the micron range—conservatively rated for removal of

particles .0015 in. (40 micron) in size—is now available with a new all-metal, edge-type filter cartridge, designed and produced by the Cuno Engineering Corporation of Meriden, Conn. Especially adaptable for lubrication, hydraulic and fuel applications, the new filter assures a fine degree of filtration plus high flow capacity. A typical filter, measuring only 4 in. face to face, handles in excess of $7\frac{1}{2}$ gpm of 50 SSU fluid at 2 psi drop. The compact, cleanable all-steel cartridge is designed to fit a wide range of standard housings. In addition, head and cartridge assemblies, for use as integral parts of equipment, can be supplied. **ITS NEW**

New Filter Catalog

Depth-type fiber cartridge filters for full flow filtration of all types of fluids are presented in the new Micro-Klean Catalog of the Cuno Engineering Corp., Meriden, Conn. Complete information is given on the full advantages of Cuno's exclusive "graded density" cartridge construction. Selection of the proper filter and filter cartridge to meet any application requirement is facilitated by the Micro-Klean Selector Chart, cartridge life curve, flow rate table, and other product performance information contained in the catalog. Essential dimension, weight and installation data complete with line drawings and pictures is provided for the smallest to the largest filter model series. Write in for your copy of Catalog #53-101. The Cuno Engineering Corp., Dept. 53, South Vine St., Meriden, Conn. **ITS NEW**

Briggs Names Canaris

Mr. James M. Canaris has been appointed director of engineering of The Briggs Filtration Co., Washington, D.C., according to an announcement made by J. H. Nash, vice president and general manager of the organization. Mr. Canaris has been a member of the Briggs sales-engineering staff since 1956, prior to which he served as vice president in charge of engineering at the Lofstrand Company. His new duties will involve close contact with commercial, industrial and governmental sources, especially in connection with the rapidly expanding jet fueling program of The Briggs Filtration Co.

Miehle-Goss-Dexter Subsidiary Renamed

The name of Christensen Machine Co., Racine, Wis., has been changed to M-D Blowers, Inc., Earl L. Fester, general manager, announced. The company will continue to operate as a subsidiary of Miehle-Goss-Dexter, Inc., Chicago, world's largest manufacturer of graphic

arts equipment. Fester also stated that the treasurer's office and chief accounting function of the company has been transferred from the Dexter offices in Pearl River to Racine. He said that all executive offices of the company will be located in Racine. M-D Blowers produces industrial blowers and rotary superchargers for general industrial uses at its Racine plant, 100 Fourth Street.

HERE IS IMPORTANT INFORMATION! The completely new 1958 edition of the **DIESEL ENGINE CATALOG**, Volume 23, is now available. If you design, purchase, sell, operate or service diesel, dual fuel or gas engines, the Catalog is essential to you. This giant, 400 page, $10\frac{1}{2}$ " x $13\frac{1}{2}$ ", fully illustrated reference book has been revised, rewritten and brought up to date completely from cover to cover. Send your order in now for this limited edition, which costs \$10 postpaid plus California sales tax where applicable. Send checks or company orders to **DIESEL ENGINE CATALOG**, 816 N. La Cienega Blvd., Los Angeles 46, Calif.



ideal performance

Four outstanding reasons why IDEAL Generators are best suited to your specific generating requirements:

- **CUSTOM DESIGN** — each unit engineered to your specifications with ample capacity to withstand overloads for extended periods.
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- **PROVEN ECONOMY** — power plants equipped with IDEAL Generators have won REA Economy Awards three years running. Hundreds of other units show substantial savings in operation and maintenance.
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UNIFIED RESPONSIBILITY

Low and high-speed types in ratings from 10 to 10,000 KW, with switchgear and controls for all applications. Extra emphasis on rugged construction, with a wide selection of insulations and a patented bearing design for simple, easy replacement.



EMERGENCY STANDBY—Typical high-speed unit installed on a diesel generating set in a Midwestern metropolitan telephone exchange.

Write for Bulletins 505 and 510



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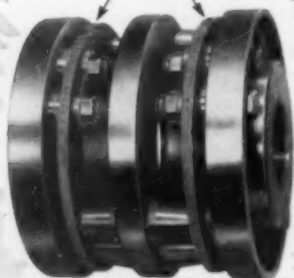
NO LUBRICATION

NO MAINTENANCE

NO WEARING PARTS

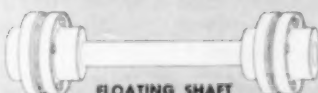
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ALL METAL
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FOR MAINTENANCE FREE
POWER TRANSMISSION
on PUMP, COMPRESSOR,
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"TOMALOY"
FLEXIBLE DISC RINGS



DBZ — for high speed, heavy duty drives

Thomas' 40 years of flexible coupling experience is at your disposal to help you meet ordinary applications or special variations for unusual cases.



FLOATING SHAFT
BMR — for heavy duty service with excessive misalignment



SINGLE FLEXING
SS — for engine-driven generator sets with out-board bearings



DOUBLE FLEXING
AMR — for engine and medium speed drives

UNDER LOAD and MISALIGNMENT
ONLY THOMAS FLEXIBLE COUPLINGS
OFFER ALL THESE ADVANTAGES.

- 1 Freedom from Backlash
Torsional Rigidity
- 2 Free End Float
- 3 Smooth Continuous Drive with
Constant Rotational Velocity
- 4 Visual Inspection While
in Operation
- 5 Original Balance for Life
- 6 No Lubrication
- 7 No Wearing Parts
- 8 No Maintenance

Write for Engineering Catalog

**THOMAS FLEXIBLE
COUPLING CO.**

WARREN, PENNSYLVANIA, U. S. A.

New Cooper-Bessemer Subsidiary Renamed



T. E. Kraner

Following closely Cooper-Bessemer's recent acquisition of Creole Engineering Corporation as a wholly owned manufacturing and engineering subsidiary in Houston, Tex., is the change in name to C-B Southern, Inc., now officially announced by Eugene L. Miller, President of The Cooper-Bessemer Corp. This new subsidiary operation, headed by T. E. Kraner as President, is said to set a precedent as the first wholly owned manufacturing subsidiary established in the heart of the oil country for the manufacture of products for gas gathering requirements. President Kraner, formerly district manager for Cooper-Bessemer in Caracas, Venezuela, and more recently in New Orleans, states that C-B Southern's initial engineering and manufacturing will concentrate on completely packaged, pre-piped gas engine compressor units of the type widely marketed by Cooper-Bessemer for gas gathering and similar requirements, but formerly packaged by other companies. This initial phase of operation is soon to be followed by the introduction of other compressor products of particular significance to the areas strategically served by C-B Southern, Inc. Cooper-Bessemer's President Miller points out that the new subsidiary operation not only is expected to further improve the corporation's strong service position long maintained in the oil country, but it also means undivided responsibility to customers for successful gas gathering machinery performance.

Deutz Powered Craft

The *Frosty Morn*, a new 200 ft. by 36 ft. by 12 ft. manhaden fishing craft is operating in the



fleet of the Fish Meal Company along the Jersey coast. The craft is powered by two direct reversing 650 hp Deutz diesel engines, another Deutz diesel engine supplies power for the generator set. The vessel is one of about 100 fishing craft owned by J. Harvey Smith of the Fish Meal Co. and has seven other diesel engines of other makes on board. It was built by the J. F. Bellinger & Sons Shipyard on the inland waterway near Atlantic Beach Florida.

C. Lee Cook Appoints Hershberger



V. R. Hershberger

Mr. V. R. Hershberger has been appointed as sales representative for the C. Lee Cook Co., manufacturer of piston rings and rod packing rings, for all of Eastern Ohio, according to C. Lee Cook Sales Manager, William Barnes. Mr. Hershberger, 42, resides in Canal Winchester, Ohio.

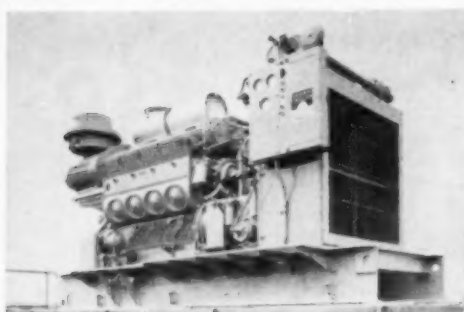
He has been in the field of sales engineering for the past seven years, and most of this experience has been in mechanical packings. Prior to entering the selling field, Hershberger had served as a mechanical engineer for the Indianapolis Power and Light Co. for 14 years. He studied engineering at Purdue University.

Robert Bosch Holds General Sales Meeting



The Robert Bosch Corp. recently held a sales meeting at its Long Island City headquarters. With its full sales force in attendance the program was based on full product indoctrination. Shown here in front of the company's entrance are a group of the sales personnel with Sales Manager W. Boedecker, third from left; and Assistant Sales Manager T. Stevens, front row, first from right.

900 HP Self-Contained Power Unit



A new power unit for pumping operations, a 900 hp self-contained diesel set, is shown outside the La Grange, Ill., plant of Electro-Motive Division of General Motors bound for Lake Maracaibo, Venezuela, where it and a second unit just like it will be used by Sun de Venezuela, subsidiary of the Sun Oil Co., to pump crude oil from storage tanks into ships. The unit, designated the SK-10, features an 8-cylinder General Motors 567C engine with all accessories including fan and radiator mounted on a skid. The overall length is 18 ft. with a width of 7 ft., 8 in. and a height of 9 ft. 8 in. over the air filter. Dry weight of the unit is 31,500 lbs. It is designed to meet demand for stationary applications requiring a complete engine set in the 900 rpm, 900 hp class.

Personnel Boat Contest

The new 41 ft. personnel vessel *Contest* was delivered recently to the Merritt-Chapman & Scott Corp. by Diesel Shipbuilding Co. of Jacksonville, Fla. The all steel vessel has a length of 41 ft. and a beam of 12 ft. and draws 5 ft. of water. Propulsion is provided by a General Motors model 6-110



diesel engine having a continuous horsepower rating of 220 at 1800 rpm, and General Motors 2.5:1 marine reduction gears. Fresh water keel cooling is used. Craft will be used by the new owners for tending divers, carrying personnel and for towing.

New 650 HP Menhaden Boat

The *Sandy Hook*, a 150 ft. menhaden fishing vessel, was launched a few months ago at the J. F. Bellinger & Sons Shipyard near Atlantic Beach, Fla. on the Intracoastal Waterway. The twin screw vessel is owned by Harvey Smith of the Fish Meal Co. who operates a fleet of about 100 dieselized fishing craft. The *Sandy Hook* is powered by a pair of naturally aspirated Superior, model 40-M5-6 direct reversing 8½x10½, diesel engines which are rated 325 hp at 830 rpm. The Liaen-Wegner controllable pitch, stainless steel, three bladed propellers are 5 ft. 6 in. in dia. These propellers are especially adaptable for service in the menhaden

fleet vessels because of their creep speed control and greater maneuverability. Also in the engine room are two Kato 20 kw generating sets powered by two Nordberg diesel engines plus a D318 Caterpillar diesel for the 10 in. water pump and an 8 cyl "V" Deutz air cooled diesel for the 16 in. Fairbanks Morse fish pump. During the trip north from Florida to New Jersey the Chief Engineer reported fuel consumption was a good deal lower than they had anticipated.

The *Sandy Hook* on her maiden trip to New Jersey waters. She is 200 gross tons and carries 300,000 fish. Speed is 12 knots.



Tuthill General Sales Manager



M. J. McCaughey

Mr. J. G. Tuthill, president of the Tuthill Pump Company, Chicago, has announced the appointment of Michael J. McCaughey as general sales manager of the company. Mr. McCaughey, an engineering graduate of the University of Notre Dame, first joined Tuthill in 1954 as a sales engineer. He was named regional sales manager of the company's midwestern region in January 1957. A resident of Park Ridge, Ill. Mr. McCaughey was previously employed as a sales engineer by the Parker Appliance Co. and served as an officer of the Navy's Seabees during World War II. In his new assignment McCaughey will direct sales of all the Company's products which include positive rotary pumps for hydraulic, lubrication, coolant, oil burning, circulating and other services.

NOW...2
TORQUE RANGES
(to 900 Foot pounds)

both from one

STURTEVANT
TORQUE WRENCH

Now you can do high torque work with a Sturtevant Torque Wrench of normal capacity range—small in size—light in weight—with fine increment markings and moderately priced.

With a new Multi-range, Multi-purpose Adapter you can step up the capacity of your Torque Wrench to a new high range and you can plug in any drive end you want... Box wrench, ratchet, drive square for sockets.

All drive end accessories are interchangeable and stock items.

In this way each Sturtevant Torque Wrench effectively equals two complete sets of ordinary single purpose Torque tools.

Adapter Slide rule sent FREE if requested on company letterhead.

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ADDISON **QUALITY** ILLINOIS

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surfaces where
FREQUENT
REPLACEMENT
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INSIST ON **M-C-M**
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What's it worth knowing the equipment will start in any weather, climate or service?

Only one battery made today can guarantee you the consistent breakaway power you want for dependable heavy duty starting—the Gulton "GO" nickel cadmium alkaline battery.

Reason: it delivers peak currents as high as 20 times rated capacity. That means more than

enough punch to start the orneriest engine on the coldest day.

If you're losing money on balky equipment, it's time to look into the many benefits of "GO" batteries. For example, maintenance: practically nil; service life: no other battery can beat it.

"GO" batteries cost more to begin with—5 times as much—but they soon pay their way in dependable starting. And they'll outlive the engine they're starting. Get full details on why more and more Diesel operators are turning to "GO" batteries for end economy. Write for Bulletin GO-300.

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Metuchen, New Jersey




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America's largest GM fuel injector rebuilder



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THERMOMETERS**

These instruments are a series of marine type thermometers designed for all diesels and all plant uses—water or oil.

FEATURES All brass construction, nickel finish, cork insulation.

(Repair service available)


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40 years continuously in the diesel engine business.

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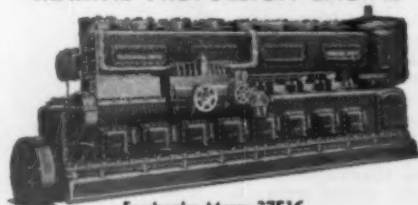
EATON VALVES

**Custom-Tailored
for Your
Diesel Engines**



**EATON
MANUFACTURING COMPANY**
VALVE DIVISION
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NEW • UNUSED CURRENT MODEL MARINE PROPULSION ENGINE



Fairbanks-Morse 37F16
7 cyl. — 1400 HP — 300 RPM
Direct reversible • Top ABS-Rating
Priced To Move

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TERMINAL ISLAND (Los Angeles Harbor), CALIF.
PHONE: NEVada 6-9871

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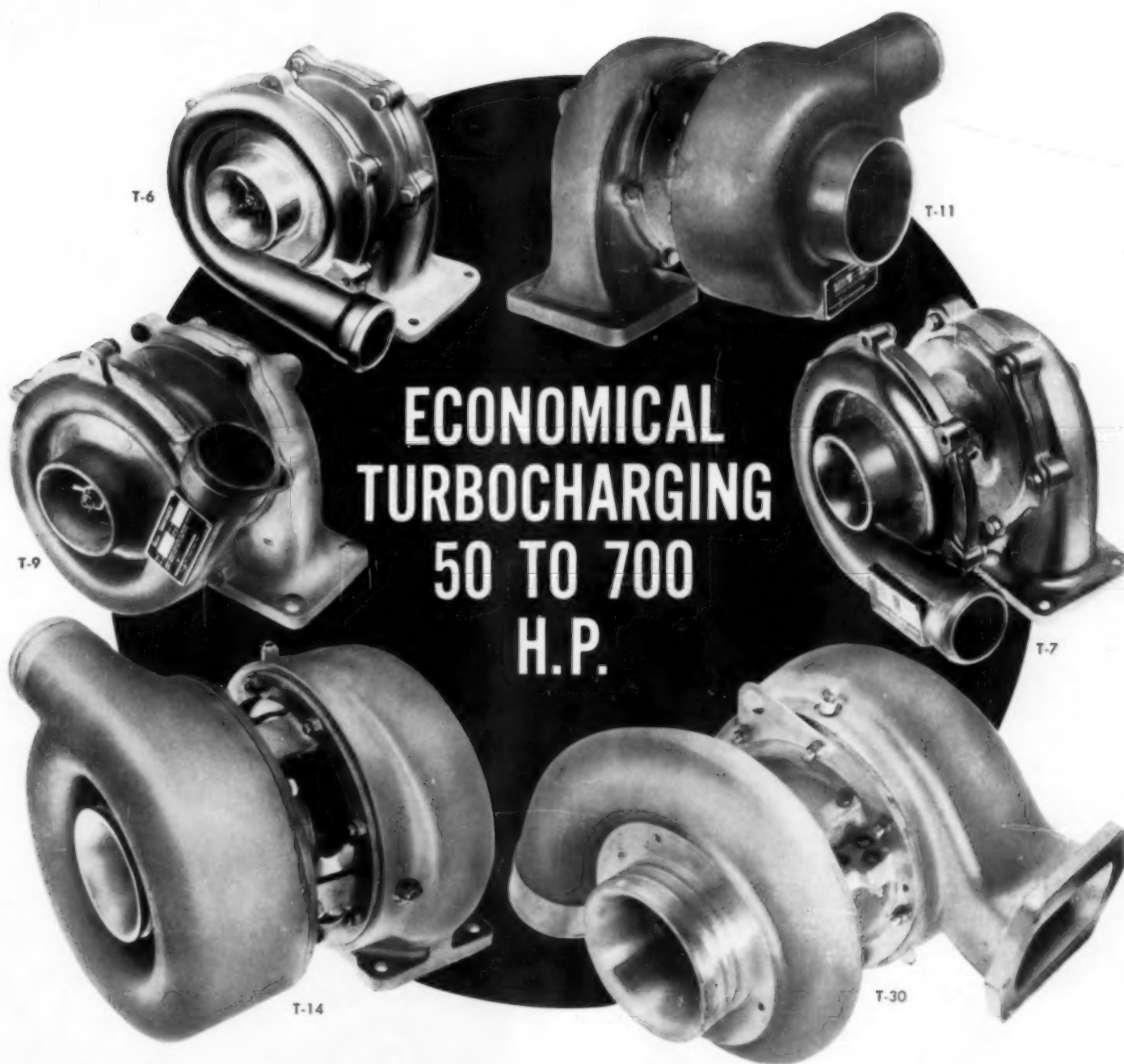


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